The Builder.

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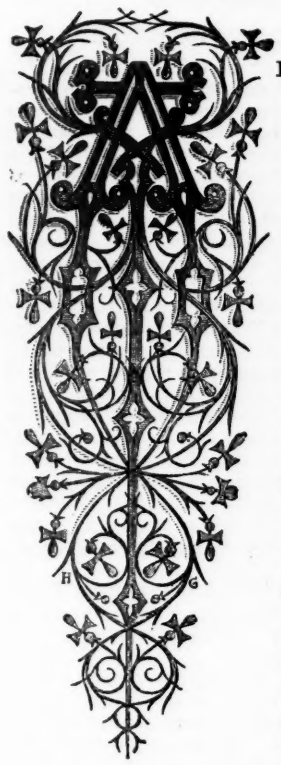
Picturesque Designs.



DELIBERATE and intentional effort after what is termed "the picturesque" we hold to be, in the main, a very delusive pursuit for any architect to engage in. It is true that our prejudices on this head may have been excited to an unjust extent, by the average published results of such a pursuit. We can call to mind few instances of what are termed picturesque designs for villas, and so forth, which have not literally illustrated the term applied to them, in that they have been fit for a picture, and for nothing else. The quality of picturesqueness itself is, indeed, as regards architecture, at least, a sort of artistic *ignis fatuus*, indefinable by those who are in chase of it; a fact which is admitted by the author of the volume before us,* who observes at the commencement of his introduction that "the architect usually considers that if his building look well when seen by moonlight, or through the medium of a foggy or dull atmosphere, it is picturesque, and he is satisfied." And though the author professes to elucidate more correctly the theory of the picturesque, and even tells us (p. 24) that "the *general principles* for obtaining that effect have been pointed out," we do not find ourselves much nearer the mark after reading his introductory essay. His very first example is from the *ruins* of a Roman temple, which may, no doubt, be "highly picturesque" when time and weather-stains have done their work upon the masonry, and when "the even regular lines of the doors and windows are broken, and through their ivy-fringed openings is displayed, in a highly broken and picturesque manner, that striking image described by Virgil:—

> 'Apparet domus intus, et atria longa patescunt,
> Apparent Priami et veterum penetralia regum.'"

But with such picturesque dilapidation, architecture, as we understand the term, has nothing to do; and as to the quotation from Virgil, we have always considered the real charm of that magical passage to lie precisely in the *architectural* effect of the stately palatial vistas and corridors, suddenly opposed in our fancy to the picturesque glare and confusion of the battle and conflagration outside. Waiving this, however, it may be said in general that picturesque effect, if sought for as a primary object by the architect, is very likely to be gained at the expense of, and in opposition to, the legitimate architectural desiderata both of construction and design; but that, on the other hand, where truthful and sober architectural design and construction are sought for in the first instance, the result is very likely to include also what most people will admit to be in one sense, picturesque, without too closely defining the term. Indeed, our author confirms this view himself, when he observes (p. 9) that the Gothic style of architecture "is remarkable for its picturesque character, and may fitly be adduced as an example of that quality in the absence of an exact definition of the term:" since there is no style whose main features are more directly the outgrowth of constructional influence and requirements. If, however, Mr. Richardson fails to make us converts to the picturesque school, we can recognise in his book, nevertheless, a substratum of sound common sense in practical matters, with a good deal that is suggestive as to the artistic planning and treatment of domestic edifices.

It is only fair to observe that the author professes to put forth this work rather for the guidance of non-professional than of professional men. Commenting on the fact, familiar to every architect, that a client is in many cases totally unable to explain intelligibly to his architect what it is that he requires, or even to form a conception of it himself, Mr. Richardson thinks, nevertheless, that,—

> "When a variety of designs is placed before the eye of any intelligent person the act of selection becomes easy. Although no single plan may succeed, a combination may suggest itself, and the architect can then readily work on something like a sound foundation, and with the hope of success. This work is intended to supply such requirements." (p. 26.)

To this end readers are presented with forty-one designs, accompanied with plans (and in some cases details of ornamentation) for various kinds of erections, including villas of large and small size, summer-houses, bath-houses, garden-seats, stabling, &c., in very varied styles, in some cases somewhat abnormal, and nearly all more or less illustrating the author's predilection for that rather irregular and sometimes fantastic treatment of general designs or of detail which in most minds is associated with the term "picturesque." To some of the best of these justice is scarcely done by the engravings, which (the perspective views especially) show no very great finish of execution; and the author had better have cut out altogether the fanciful frontispiece opposite the title-page, and the view of a "Greek Temple" preceding the introduction; the latter engraving in particular is sufficient to prejudice any architectural reader against the rest of the work. But amongst the multifarious illustrations which follow are some which possess a good deal of novelty and originality. With regard to the first few designs for small lodges, cottages, and houses, the demon of the picturesque has played his usual tricks with the designer, suggesting the employment of unsquared boughs in the place of pillars to porches, and other "gauds" which we are not worthy to denounce. But the arrangement and design of the lodge (No. 10), intended for a triangular site commanding three roads of approach, is simple and ingenious, and the effect (we should judge) pleasing, in spite of the unhewn posts to the porches. No. 11, for a gateway and lodge in the castellated style, is also pleasing and effective. "The family architect," observes the author, "in such cases, will have to make various sketches before one is selected that gives general satisfaction;" a statement which a good many "family architects" can probably corroborate from sad experience. Few architectural students of the present enlightened epoch will see without a smile the design (No. 12), for a stove bearing the outward form and semblance of a half-length mailed and helmeted figure, though some old stagers will perhaps find a sort of relief, in these tremendously virtuous days, in coming across a thorough bit of deceptive whimsicality such as this. Passing over some designs calling for no special comment, we come, at No. 21, to a pretty and picturesque idea for a bath-house and summer-room, intended to be erected on a site in a park in Kent, enjoying an extensive prospect.* The ground-floor forms the bath, supplied by a natural spring of water, and a separate entrance leads up to the sitting-room above, corbelled out beyond the line of the lower story. Of this we give a view; the plans have their titles interchanged in the book, by some error. Details also are given on a larger scale in the book, of the panelling, &c.; the whole, though a little thing, is a pleasing specimen of English half-timbered design. A more elaborate production of the same nature is No. 23, "a villa in the old English wooden style," suggested by an elevation given in "John Thorpe's Sketch-Book." This is a tolerably large dwelling-house, in external appearance a timber and plaster erection, although in fact "the timber was merely intended as an appendage to the brickwork. The exterior walls were to have been two bricks and a half thick on the ground-floor, two bricks above. The wooden posts and pans were let into the external half-brick, and well built in; the ornamental woodwork in inch oak, screwed to the wood quartering; the space between them filled with plaster, with an ornamental pattern stamp on it; and the columns and entablature were of oak." A very symmetrical plan gives more soberness and unity than would otherwise belong to the style of decoration employed; and a noteworthy point in the design is the use made of two octagonal cupolas which rise (on the garden front) slightly above the main roof-ridge, as what the author terms "garden-bower" rooms. The roofs of these rooms were to be constructed in iron and glass, and covered internally with wire trellis-work, up which fruit-trees could be grown. The perspective view placed at the commencement of the volume (erroneously entitled an "elevation"), and which we reproduce, gives a good idea of the design; but in this and the elevations it is apparent that the designer has not sufficiently remembered that forms which look well on a small scale in decoration may be quite unsuitable on a larger scale: witness the large scrolls and curls of the ornamental woodwork. A similar defect spoils the best of his designs for a garden-seat (No. 31), which is only hindered from being really pleasing and successful by the Brobdignagian scroll-work at the top, which, besides its inherent clumsiness, reduces the scale of the whole thing. A design (No. 35) for a Riding-house and Stabling is worth attention for its simple plan combined with more of architectural grouping than is always seen in buildings of this class, and an elaborate and grand scheme for a sculptor's villa (No. 29), may prove suggestive to those who have to carry out any such thing on a large scale. This is a plan for a large and almost palatial villa, having a long sculpture-gallery in the centre, between the suites of rooms, occupying the whole height of the building, with an open gallery running round it on the upper floor, the ground floor opening at one end through an ante-room into a spacious circular conservatory; while at the opposite end the vista is terminated by a grand group of sculpture, round which, as a base winds the ornamental staircase leading to the upper gallery.

A scheme to which the author attaches some importance is that described in the course of the chapter on "Queen's Gate Lodge, Hyde Park," for laying out the site between Brompton and Kensington originally purchased at the instance of the late Prince Consort for the erection of a Central Hall of Arts and Sciences, and other

* "Picturesque Designs for Mansions, Villas, Lodges, &c., with Decorations, internal and external, suitable to each Style." By C. J. Richardson, Architect. London: Atchley & Co.

* See p. 289 for Illustration.

cognate institutions thereupon. Mr. Richardson thinks it "cannot be supposed that a sum of 340,000*l.* would have been expended by the nation for the purpose of giving the Horticultural Society a perpetual lease of the best portion of the estate purchased. It is already evident that the gardens are not well situated there. . . . In much less than fifty years their grounds will, probably, be the centre of London, and consequently the noble conception of his Royal Highness has still a good chance of being carried into effect." Considering that the term of years proposed for the transformation is one that will, it is to be feared, preclude the idea of our amiable author himself reaping any benefit from it, the interest he evinces in it is, at all events, disinterested; and those who wish to see at once a grand and useful *place* formed on the site alluded to, may thank him for "stirring up their pure minds by way of remembrance," touching its possibilities, even if they are not satisfied with his scheme. This latter, however, so far as we can judge from a somewhat meagre bird's-eye view (page 105), representing the design "intended to embody the views of his Royal Highness Prince Albert," or rather that portion of it which faces Queen's Gate, would have, if carried out, a sufficiently dignified and architectural effect, besides being arranged (by the author's description) with a commendable attention to convenience and symmetry of plan. The level of the ground on the north at Kensington is about 36 ft. higher than the portion at Brompton—

"By putting the level of the ground floor of the new building about 10 ft. above that of the Kensington-road, a sub-basement would have been obtained, over 30 ft. in height, affording ample space for arranging and storing works of art, as well as for receiving articles to be exhibited, or a great portion of them, from the upper parts of the building, should the latter be wanted for any special purpose. The Hall of Arts and Sciences was to be placed in the centre of the mass of building; a portion of the dome is to be seen in the view at the upper left-hand corner. This room was to be made 300 ft. in length by 180 ft. in width. Two galleries for painting, each 1,000 ft. in length by 80 ft. in breadth, were to be placed on each side of the central hall. The sculptures from the British Museum were to be deposited in the central smaller halls of approach. The various societies were to occupy the side wings, each having its meeting and lecture room, and all necessary offices and apartments. The public were to enter at the portico seen in the view, and the carriages of the professors at the gateways in front."

Let us hope, in regard to this last provision, that all the professors possess carriages (a point which is apparently assumed); in which case this wholesale professorial charioteering would perhaps be one of the finest parts of the show. But the whole scheme, if savouring a little of the spirit of Haussmann as to its grandeur, is one which it is worth while to keep before people's minds.

Our author's practical observations upon points connected with the comfort of houses are many and various, and such as we cannot go into at any length. In ventilation, his principle is that the staircase is the natural ventilator of a dwelling; "from this general opening communications can be made into, and from, each apartment by apertures placed in some convenient position in each room;" the air being warmed and ascending on entering the staircase-well. But care must be taken not to make too wholesale an inlet of air for ventilation, in this climate. A case once came under our notice, in which a gentleman who was determined to have his house systematically warmed and ventilated, had it built with windows permanently closed and air-tight, all air being admitted through large gratings in the basement story, warmed there, and passed up by the staircase-well through the house. But the first gusty day after he went into occupation his ventilating gratings were to be seen stuffed up with straw and matting; the east wind had begun to have its own way all through the house, and he had found that there was such a thing as too much ventilation. In a long chapter on "the Fireplace," and all connected with it, the author replies to the supposed question, "What has a work on picturesque architecture to do with either smoke or sewer gases?" by affirming, with much reason, that buildings never will look picturesque while covered with great patches of soot, nor while stuck over with "tall-boys." These last are, indeed, the bane of the architect; but it was remarked in these pages years ago, that architects in general had come to no conclusion as to how to design chimneys; and we do not seem to be much nearer the mark now. "The public," says Mr. Richardson, "have so long been accustomed to be choked with smoke, and their health affected by deleterious gases, that they look upon the proposal of any scheme to secure pure air as the fond hallucinations of dreamy philosophers or inexperienced Utopians." His schemes for ensuring up-draught and preventing down-draught in chimneys, for collecting the soot before it reaches the external air, preserving and utilising it (one of the means suggested of doing this is to pass the smoke through a light spray of water, by a method illustrated by diagrams, and before now mentioned by us), are worth attention as suggestions, at all events; in these matters, the proof of the pudding is in the eating. With regard to the warming of buildings, there is a description given of the application of the hot-water circulating system, "introduced into his dwelling by one of our most eminent philosophers," which deserves to be noted. The whole length of piping was, by means of a multiple cock, divided into four circulations, any of which could be turned on or off at pleasure. Thus,—

"In winter the hat-room received a portion of piping, so that coats and gloves, even in the dampest weather, were always kept dry. One circulation was sent through the dining-room a short time before it was used; it was after a certain time turned off and sent through the bedrooms and dressing-rooms. The various rooms in winter were kept at different temperatures, the dressing-rooms were a few degrees warmer than were the bedrooms: an inducement for early rising (adroit philosopher!) . . . . In the morning, about seven o'clock, the fire was well shaken by means of a lever attached to the bars of the grate. Coal or coke was supplied, and the air-valve opened. The stop-cock was then turned on to supply the coils for the library and stairs. At about eight o'clock in the evening the stop-cock was turned to heat the coil of the bath, and at eleven o'clock, fuel having been supplied, the air-valve was completely closed, and the damper if necessary. By these means the fire burned very slowly during the whole of the night, and the bath cistern received the warmth thus generated. These conveniences and luxuries might be more generally applied than they are at present in the dwellings of this country."

In which latter remark most readers will concur; indeed, we may say with Bunyan's Pilgrim that "the hearing of these things is enough to ravish one's heart."

We hope that no non-professional reader who may get hold of Mr. Richardson's book will expect his architect to adopt the suggestions made therein as to the use of encaustic tiles in floor and wall decoration. The short chapter on this subject is the most singular instance of the recommendation by an architect of precisely the wrong thing in architectural taste that we have ever seen. The author speaks with contempt of geometrical tile-patterns, as a stiff conventional decoration; and, by way of making them "more artistic and pleasing," he proposes a sort of realistic design imitative of knots of buds and flowers carried through irregularly from one tile to another; or, in the case of walls, an apparent trellis, with leaves and flowers intertwined, upon a blue ground; "the design would then show a flowered trellis against the sky;" or, in other words, make the wall look like what it is not, and give the appearance of relief where everything should be quite flat. This would be very well for a summer-house in a German tea-garden, but all such permanent mural decoration in a really architectural building should surely partake of a strictly architectural character. Our author, however, is in search not of the architectural, but of the picturesque, and hence these aberrations. With regard to ornament in perforated woodwork, too, of which Mr. Richardson gives us sundry little French specimens as illustrating the superiority of our neighbours in this way, we must say that we have seen far better ornament of this kind cut by English workmen from the drawings of English architects. The specimens given by Mr. Richardson are coarse and commonplace in comparison. This sort of ornament requires to be treated with delicacy, and not cut in large or too irregular patterns, or it looks ragged and clumsy. Those who may be tempted, in a search for the picturesque, to make trial of the old-fashioned English timber style, should be cautious so to tie in their fronts to the beams and joisting of the floors as to make the whole one construction, horizontally as well as vertically, otherwise in course of time the front will show a tendency (as some of those in Chester have long done) to hang over and part company with the rest of the building.

Lastly, speaking generally, we may say that though there are in the volume before us things which we do not approve, and which few architects of the younger generation will concur in, the latter may very well pardon a little that is "old fashioned" for the sake of gaining a good many suggestions, especially upon some practical points, characterised by much common sense, and which may stimulate them to give attention to points which they may have been too ready to consider as secondary and uninteresting. Mr. Richardson is an old labourer in the architectural field, and has done useful work in his time.

There are a good many printer's errors in the book, some so very glaring as to render it evident that circumstances must have interfered with the author's final revision. "French marionette" for "maisonnette" (p. 251, and in the index also) and "drainage" for "drain-eye" (p. 357 *et seq.*), are among the worst; and there are some others which will be apparent to the reader.

UNIVERSAL ART INVENTORY.

IN a recent number of this journal (p. 117, *ante*), while giving an analysis of the provisions of the Government measure for the general primary education of the country, we incidentally referred to the efforts of the Science and Art Department of the Government for the spread of technical instruction, as being intimately connected with the general educational state of Great Britain, and successful during the brief period covered by their history.

While the definitive plan of our future primary instruction is yet under discussion, the labours of "the Department" have entered on a new, and a very important, phase. If we regard the South Kensington Museum as a great establishment for the education of the workman by the eye,—an object in the attainment of which it is certainly without a rival in the world,—it may yet be objected that the advantages which it offers are confined to the residents or visitors of London, supplemented only by that degree of stimulus which may be given to the Art education of the provinces by the circulation of objects on loan.

To obviate this objection, the attention of the managers of the Institution has been directed to the Literature of Art. We are not now referring to the Art Library itself. Every library is necessarily local in its main utility. But a series of special catalogues, each comprehending an exhaustive description of some minor division of the collection, is now beginning to appear. Several valuable monographs of this nature have been very recently completed, and others are in course of preparation. The results of the whole will be such a complete and classified description of all the costly treasures collected beneath the roof of the museum as will be of the utmost value to students who are unable to visit the spot, and of scarcely less notable service to those who are able, when in the museum, to devote only a limited time to the study of any particular branch of art.

Among these literary products of the museum, five works dated in the present year are now before us. Of these the first, or at all events the most voluminous, is entitled "The First Proofs of the Universal Catalogue of Books on Art compiled for the Use of the National Art Library and the Schools of Art in the United Kingdom. Vol. I., A. to R." Then we have a catalogue of the gems and precious stones bequeathed to the South Kensington Museum by the Rev. Chauncey Hare Townsend, M.A., drawn up by the lucid pen of Mr. James Tennant, F.G.S., Professor of Mineralogy, King's College, London. A descriptive catalogue of the musical instruments, illustrated by eighteen cuts, has been prepared by Carl Engel. A new edition of the "Guide to the Museum" brings down this useful manual to the present date. And an entirely new literary feature has appeared under the startling and ambitious title of a "Universal Art Inventory, consisting of brief Notes of Works of fine and ornamental Art executed before A.D. 1800, chiefly to be found in Europe, especially in connexion with Architecture, and for the most part existing in Ecclesiastical Buildings." This work has been edited by Mr. Cole.

The origin of the Art Inventory was a request addressed by Earl Russell in 1864, on the motion of Earl Granville, the Lord President of the Council at that date, to her Majesty's representatives at Paris, Dresden, Berlin, Munich, Turin, and Rome, that they would forward to London catalogues of the galleries, museums, and collections of objects of art now existing in the chief cities of Continental Europe. It was proposed that the information thus obtained should be arranged in the form of an inventory, which would be of service not only for the United Kingdom, but also for other countries.

The replies to their inquiries were satisfactory in one respect, and in one alone. They distinctly show that, whatever perfection may hereafter be

attained by so admirable a scheme, it is to this country that not only the origination of the idea, but the first blocking out of the plan must be exclusively attributed. However backward we may ourselves have been in preparation of records of the art of the world, we have, at all events, been the first, not only to detect the deficiency, but to take measures for its removal.

Mr. Odo Russell sent to the Foreign Office seven catalogues of public galleries, and five printed and three MS. catalogues of private galleries, in Rome. He observes that the Vatican catalogue of antiquities is unworthy of the collection. That of the Capitoline Museum is out of print. The Lateran Museum, that of the Accademia delle Belle Arti, the Galleries of the Palazzo Rospigliosi, of the Villa Albani, and the frescoes in the public and private palaces of Rome, are uncatalogued. Murray's Handbook is quoted by Mr. Russell, as containing the best account of all the objects of art in Rome.

From Berlin Sir A. Buchanan returns twelve catalogues of pictures, sculpture, and antiquities, and a reference by Dr. Waagen to a German work, "Deutschen Bilder Saal Verzeichniss der in Deutschland vor handmen Œlbilder verstorbener Maler," an expected new edition of which was to contain "a notice of all the best catalogues." The "Art Topography" of Germany was also recommended by the Minister of Public Instruction; but "a collection of trustworthy and complete material, in the sense wished by her Majesty's Government," is only regarded by his Excellency as "a work which would take up a great space of time even to persons educated for this purpose." (The English of the communication appears to be that of the Prussian minister.)

The Italian Minister for Foreign Affairs communicated to Sir H. Elliot fifteen printed, and eleven MS., catalogues of paintings and "*oggetti d'arte*;" with the explanation that *none* of the galleries and public museums of the State possessed complete printed catalogues, and that a detailed description of their treasures would be "a work so colossal and expensive that it cannot be undertaken at present." It may be observed in passing, that no Italian description appears to exist, either of the fine armoury at Turin, or of the interesting collection of paintings in the Palazzo Madama in that city.

From Munich, the information is yet more meagre; being confined to the suggestions of Professor von Hefner Alteneck as to the mode of complying with the wishes of the Committee of Council on Education, and a promise that Baron Schrenk will confer with the Minister of Public Works on the subject.

Thus, in the main, Mr. Murray's hand-books are the only generally available guide for the investigation desired by the Science and Art Department. They have been freely quoted in the compilation of the "Universal Inventory."

Mr. Cole has laboured with characteristic courage and perseverance to fill up the vast blank thus shown to exist. We have now before us Parts I. and II. of the "Inventory," treating respectively of mosaics and of stained glass. "The work," the preface very properly states, "must be considered as a beginning, and is not complete: notices of objects which are omitted, and corrections, will be thankfully received." As it is, it may be considered as an index to the literature of the subject; as an identification, rather than as a description, of the objects named; and, above all, as a guide to the traveller, the tourist, and the local observer and annotator, who may be educated in art, not only as to what to visit, but (which is far more important) what to describe. The series of communications which we trust that the publication of this "Inventory" will provoke may lead, in course of time, to the completion of a really exhaustive catalogue.

The inventory of "Mosaics on Walls, Pavements, Mosaic Encaustic, &c., Cabinets, &c." is preceded by a list of sixty-seven publications which have been consulted for the work. This list, however, is far from including all the authorities referred to in the text. It mentions no catalogues. An addition containing the titles of such of those documents as have been collected would be of great utility. The MS. notes which are cited might also be noticed in the list. On the very first page is a reference to A. Laborde, "Mosaïque d'Italica," a work repeatedly cited, but not to be found in the List, which will, no doubt, be largely supplemented in future editions.

In fact, it is evident that seventy-four clearly-printed pages can only contain, as it were, the first draught of an inventory of known mosaics. The memory of almost every traveller may be expected to furnish him, even at a glance, with additional contributions, that will no doubt be gladly welcomed by Mr. Cole. Thus, we may mention that at Brindisi, which interesting city is not named in the inventory, there exists, or existed in 1856, on the floor of the cathedral, one of the largest pieces of mosaic pavement known in Italy. In that year the Archbishop of Brindisi was proposing to destroy, or to cover this grand relic of ancient art, in order to remove the slight irregularity in the floor caused by the partial subsidence of the mosaic. In many parts of Southern Italy remains of "antichità" are abundant. They are protected by the law, and almost invariably respected by the peasantry—a striking lesson to our own barbarous rustics. Of the famous submerged pavement of the Temple of Neptune, at Sorrento, we are not aware that any account is accessible. The superb mosaic floors of the Roman villa which was discovered in the Piazza Vittoria, at Palermo, in December, 1868, were described in our own columns (*Builder*, No. 1391, p. 779), and should be mentioned in future editions of the Inventory. Their omission in the present instance is no doubt due to the fact that the title of the article in which they are described, does not contain the word "Mosaic;" as a very brief notice from our pages of the discovery of a fragment of pavement at Snodland, on the Medway, is extracted with due acknowledgment. The journal of the "Scavi," now in progress at Pompeii, is another work which should be consulted as to mosaics. It is conducted under the able supervision of the Chevalier Fiorelli.

Again, under the head "London," to the mosaics indicated should be added some account of one discovered last year, at the depth of 17 ft., on the line of the new street from the Royal Exchange to Blackfriars. This ancient relic, some 10 ft. square, merits a fuller description than it appears yet to have received.

The pavement in question closely resembles, in some particulars, former examples of Roman mosaic, which may be seen at the Guildhall Museum. In other respects it is peculiar; and in nothing does it so distinctly bear the stamp of a very remote past as in the fact that it is composed partially, if not wholly, of the fragments of buildings older than itself.

The materials of this relic consist of irregular *tesseræ*, of some $\frac{3}{4}$ in. square, of four distinct colours. The darkest of these are formed of portions of a dark grey stone, resembling Welsh slate. Next comes a lighter coloured stone, possibly Kentish Rag. Then we have a white material, apparently chalk. With these natural substances are interspersed portions of pottery or broken tile, not well-shapen, well-burnt *tesseræ*, but blocks cut by the axe or the hammer, and as rough and irregular in their approach to a square form as are the stone blocks which they accompany. The edges of the pattern, which were probably not exposed to view, are formed of larger sized blocks of stone and of brick, and the rude nature of the work points to its execution by British workmen under Roman direction.

The centre of the pavement was occupied by a circle surrounding a cross. It can not be asserted that this is a positive, undeniable Christian emblem. It closely resembles the five shields which are borne cross-wise in the arms of the kings of Portugal. The centre compartment is of a lighter colour than the four limbs. Still, whether unintentionally or not, it is an actual cross, and the fact is one that has hitherto escaped attention.

Around the cross are rings of the several colours employed in the pavement, depressed heart-shaped figures, and an attempt at the production of a cable pattern, a resemblance to which is to be found on some of the other specimens now in the Guildhall Museum. In the present case, however, the effect is that rather of a series of complicated knots than of a cable. Irregular polygonal figures fill up the pattern. The work, though rough, is solid in execution, and clearly indicated, however rude, in design. Its maximum antiquity it is, of course, easy to fix—its actual date is more doubtful. The rise of the streets of the City over its level to the height of 17 ft. is a very instructive fact.

Twenty pages of the "Universal Art Inventory" are occupied with the mosaics in the Roman States, for which numerous authorities are cited. To these, in the next edition, should be added the "Historical Photographs" of Mr. John Henry Parker, the third part of which series was published in 1869. A large proportion of the mosaics which they represent are older than the twelfth century, and some of them date from the reign of Constantine. The Paschal candlesticks and tombs of the Cosmati family, enriched with admirable ribbon mosaic, are not to be paralleled out of Italy. The reference to an accurate representation of so many of the objects indicated in the "Art Inventory" will hereafter prove a valuable addition to the information which it already furnishes.

The catalogue of stained and painted glass is preceded by a list of works in the Art Library, containing information on the subject, amounting to sixty-six, besides serials. The approaching completion of the Universal Catalogue of Works of Art, which may be expected in May, and which will contain the titles of 70,000 books, will allow of the preparation of exhaustive indexes as to the bibliography of each special branch of the Universal Art Inventory,—a feature that will add immensely to its value. It will be observed that in this first edition the titles of books on mosaics, which are quoted, form a list of those which have been consulted for the formation of the Inventory, while the list of works relating to stained glass merely refers to books in the Art Library. No doubt in future all the literary information will be arranged upon the same plan.

Seventy-five pages are occupied with the inventory of stained glass, exclusively in windows. The additions to be made in future editions will be very numerous. The list is, very wisely, so arranged as to include references to the history of famous windows now, unfortunately, destroyed; as in the case of the Chapel of the Abbey of Fontevrault, which contained three windows of twelfth-century work no longer existing. Under this head future editions should contain a reference to the blazoned windows of the ancient Chapel of Bourbon l'Archambaud (the cradle of the Royal House of Bourbon), so remarkable from the tradition that on the day of the murder of King Henri III. (1st August, 1589), a flash of lightning struck the glass, and shivered from the coat of arms the *bâton* forming the heraldic difference of the Bourbon Princes, leaving the arms of France, "*pleines*," which the blow of the assassin entitled Henri of Navarre to assume.

The ecclesiastical buildings of the Spanish and Italian peninsulas contain a large amount of glass as to which no index is as yet accessible. Batalha, in Portugal, is mentioned as having had its windows for the greater part irreparably injured by the French. In no country has the splendour of art been lavished more freely upon churches and convents than in Portugal, and there must yet be much to repay a conscientious search, in glass no less than in encrusted and inlaid marble. Genoa, too, is unnamed in the Inventory. The rich hues of the windows of the great church of the Annunziata cannot readily fade from the memory of the traveller; and there must be much more old glass yet existing in this City of Palaces.

As to English stained glass, the editor will, no doubt, receive numerous contributions towards an enlargement of his catalogue. Not to speak of smaller relics of perished works of value, or of blazonry of various dates, such as are to be found in the Mortuary Chapel of the Dukes of Bedford, at Chenies, in Buckinghamshire (see *Builder* of October 6th, 1866),—of examples of plain old coloured glass, as at Knole—there are English mansions to be added to the Inventory which are famous for their ancient windows, as, for instance, Cothele and Toddington. This latter noble residence, rebuilt, under the name of an Abbey, by Mr. Hanbury Tracey Leigh (before his elevation to the peerage), is rich in fine old stained glass, brought from Spanish convents, and should hold a place in future editions of the Art Inventory.

The windows of Fairford Church, as to which so much was written in our pages the year before last, are safely said to be from "designs attributed to Albert Dürer, and also to Francesa Francia." Very brief notices are given of the superb windows to be found at Rouen, in the Cathedral, the Churches of St. Ouen, St. Godard, St. Maclou, St. Patrice, and St. Vincent, in the Museum, and in the house of M. Bonissent. No collection of glass, either in France or in England, equals the chronological series, from the thirteenth to the seventeenth century, arranged in the Museum of Rouen.

Twenty-six large stained-glass windows, forming a complete history of Jesus Christ,

beginning from the birth of the Virgin Mary, and dating from 1527 to 1531, now exist in King's College Chapel, Cambridge. Fragments alone of stained glass are to be found in the contemporary Chapel of King Henry VII., at Westminster. Of the third of these richly ornamented efforts of this period of English architecture, St. George's Chapel, Windsor, we find no mention in the Inventory.

The large rose window in the north transept of Lincoln Cathedral is mentioned as the most important example of Early English stained glass now existing in the country. The date is stated to be about A.D. 1200. This window shows, in the central part, a representation of the blessed in heaven, with Christ sitting in the midst. Sixteen circles, each full of allegorical or doctrinal symbolism, form the outer part of the windows, and an angel tossing a thurible is figured in each of the four trefoils at the angles. Much old glass, of very rich colouring, is to be seen in other windows of this cathedral. Canterbury yet contains a window, in the north transept, which was the gift of Edward IV. and his queen; as well as representations of the figure and of the miracles of A'Becket, dating from the twelfth and thirteenth centuries. The great windows of the nave and choir of York are filled with painted glass, by John Thornton, of Coventry, A.D. 1404 to 1409. Early Norman glass, of the twelfth century, is found in the clearstory of the nave. Windows, of the times of Edward III., of Henry IV., Henry V., and Henry VI., are all extant in this noble minster; and the harmonious effect of the *grisaille* will not readily be forgotten by its visitors. In the chapter-house are seven lancet windows, exhibiting the arms of England, the escutcheons of benefactors to the Church, foliage, geometrical forms, armorial badges, saints, prophets, kings, queens, and events of sacred history. The ruby and dark blue tints are especially rich.

The sprawling Crucifixion recently erected in the central east window of St. Paul's is excluded from the "Art Inventory" by its recent date. The glass at Durham does not go back to an earlier date than 1450, and much of it is fragmentary. The glass at Winchester is of the fourteenth and fifteenth century. The great east window of the choir of the cathedral of Gloucester dates in 1345, and is the finest stained glass of the Decorated period in the country, representing a long series of prophets, saints, and Jewish kings, larger than life, and now well restored. The east window is filled with original glass of the fifteenth century, white and yellow being much employed. The ruby glass in the west window of Exeter Cathedral is "said to be some of the latest manufactured in England at the revival of the art." Rochester, which contains a considerable quantity of stained glass, some of which at least is probably old, is not mentioned in the Inventory. Ripon is only spoken of as containing "windows of old stained glass." Bath Abbey, St. Alban's Abbey, St. David's Cathedral, and other religious edifices, which bear traces of very ancient or very elaborate windows, might be referred to with advantage, as, even if no traces are now to be found of the glass, the historic record of its existence or of its destruction is not less interesting than in the case of Fontevrault. In fact, an orderly reference to all our cathedrals, minsters, abbeys, and important and ancient parish churches, even if accompanied only with the note "no stained glass now existing" might advantageously form a feature in future editions of this part of the "Universal Inventory."

It would be desirable, also, that some reference should be made to the windows of the church of San Vitale, at Ravenna, which M. Lacroix states were filled with stained glass in the time of Justinian. The walls, vaults, and apse of this church, we are informed in the catalogue on mosaics, are covered with work of this description "of the time of Justinian, as fresh as the day they were placed there." Twelve churches in this whilom capital of the world are referred to as rich in mosaics. Can they all be entirely destitute of stained glass?

We feel sure that no one will welcome the hints which have occurred to us on the perusal of this very interesting volume more heartily than the editor himself. The work forms a new claim on public gratitude. That Mr. Cole should have found leisure for its preparation, among all his toils, is in itself a matter for surprise. The attempt to construct such an inventory from the partial and fragmentary information which has hitherto been accessible, is one which demands something of the credit due to the leading of a forlorn hope. The future value and importance of the work will be very little affected by the more or less ample fulness of the first edition. The sketch of such a work is in itself no small boon to art. We venture to suggest the preparation of interleaved copies, to be sent to men who are well versed in the several subjects of the successive parts. Their return to South Kensington, with annotations and additions, will be a national benefit. As an instance that is not without an amusing point of view, let us suggest that the director of the South Kensington Museum might insert in his own private copy some description of the interesting specimens of ancient glass which are to be seen in that building, including some from the Sainte Chapelle, Paris, of the thirteenth century. No one can accuse the editor either of unacquaintance with the fact of their possession, or of egotism in giving undue prominence to this importance. We trust, moreover, that the plan usually followed in the South Kensington publications, of prefacing each special catalogue with a brief but lucid *précis* of the state of our best information on the subject to which it relates, will not be permanently departed from in the "Universal Art Inventory." We congratulate all concerned on the appearance of the work, and we trust that its reception by the public will be such as to call for the speedy issue of a second and enlarged edition.

THE FRENCH MIND.

BUILDINGS are monuments of mind, and architecture is the truest index of a nation's genius. If English art is free, varied, but often queerly whimsical, it is because the English character loves liberty above all things, even at the expense of wisdom and beauty. If French art, in its timid sameness, has the oneness of massive creation, it is for a psychological reason we here beg leave to explain.

The history of France is the history of centralisation; we might almost say, the history of *leading ideas*. Politics, literature, science, and art have always in France revolved round centres. French military monarchies, the French Academy, and French schools of art, show how readily Frenchmen will sink their individualities in behalf of an idea. Frenchmen, we repeat, are ever hurrying to *centres* which they prop up with congenial ornaments. Given an object of thought, and a French thinker there and then casts about for some dominant feature whereon to hang bright hints and ingenious speculations. If he be a dramatist, he will select some passicn, embody it in a representative being, and, by bringing it to a dazzling climax, strike the spectator home with one resistless impression. Corneille's "Polyeucte," Racine's "Athalie," Molière's "Tartuffe," are all alike in this quality of artistic structure; for each of those plays is the radiation of *one* idea. But the same characteristic belongs to lyrical and satirical poets, such as La Fontaine and Béranger, to sentimental poets such as Lamartine, and to all French historians, orators, pulpit preachers, and philosophers.

A poem like the Iliad, where every hero has his prowess-time, or *ἀριστεία*, is utterly abhorrent to French artistic conception; and equally so is Milton's "Paradise Lost," because its golden rays fly parallel into space and *converge* not. Where is the centre-piece, where the centre-deed of these epopees? objects the French critic. But the Odyssey and the Æneid, which are centralised in Ulysses and Æneas have been imitated by Fénélon and Voltaire. It is, indeed, very characteristic of the English and of the French minds that Homer is the more popular poet in England, and Virgil in France.

The arts of music and painting are also treated by Frenchmen with a view to central effects. The most striking passages in the works of Auber, Gounod, Chopin, and others, are as much the results of a scientific focalising of melody as they are outbursts of inspiration. Again, in painting, the historical school stands foremost in France, because its subjects allow of centre thoughts, *idées mères*, as they are called. If the subject be the bursting of a siege-gun in a redoubt, all the figures thronging the canvass will have an attitude or be doing a work which bespeaks the accident. Every sentry by some act of terror, every stray implement of war by its partial destruction, will tell the tale of the explosion. The general tone of the colouring will be managed so as to set off the flash and smoke of the bursting cannon. Variety in unity; such will be the French picture.

The French art of war, as understood by Napoleon, is the art of massing troops in *one* point. Napoleon's concentrating genius is French genius typified by a giant mind.

The Greek mind, which is Teutonic in its poetic exuberance and French in its method, gives us in the Laocoon group a fine sample of the qualities most valued by French sculptors. Laocoon, the central figure, at once arrests the attention of the spectator. Laocoon's sons, writhing in the knotty folds of the serpent, seem to suffer in order more boldly to bring out the anguish of their father. In conception and execution the Laocoon group is the paragon of sculptural centralisation.

Now, architecture, which might be defined as *the art of arranging parts*, is, of all arts, the the most likely to be swayed by the French spirit of centralization; so it occurs that a French building is, as a rule, the organic outgrowth of *one* idea. Every portion, every ornament of the building,—ay, the very ground it stands on and the gardens which surround it,—subserve that idea or purpose. If the building be meant for a stable, the body of the building will be so suggestive of a stable that even the most unpractised eye could scarcely fail to recognise the purpose of the erection. The wings of the building and its minutest ornaments will all be in character with the main building.

Again, no Frenchman would ever think of designing a schoolhouse like a Gothic cathedral. Such an adaptation is to him illogical, because on the face of it the schoolhouse would be a cathedral.

French architects, however, though upholding the sanctity of *ensemble*, or unity of design, are fully alive to the organic individuality of details. Vary the parts, they say, but let not the parts be foreign to the whole. Let the architect imitate God the Creator. Let his buildings be like the human body, one in purpose, infinite in useful and beautiful details.

But in order to build an edifice which will, so to say, be explained by its every part, the architect must breathe his conception into the minds of his men. Now, French workmen, true to their national genius, quickly kindle under their master's inspiration, and work up to it. Again, the public, who, in France, encourage artistic effort, will only do so with the sanction of artistic laws. So, in France, masters, men, and public are at one in carrying out with imposing unity the leading ideas of great plans.

In conclusion, English students of French architecture should approach French buildings with a conviction that the architect who has designed them can yield not only an æsthetic but a *generic* reason for their every part; in other words, that he can defend every detail of his plans on the score not only of individual beauty, but also on that of *appropriate* beauty, or *beauté raisonnée*. A French architect may err with respect to the end, but seldom fails in the means. There is judgment even in his mistakes, for his mind is a repertory of classified ideas. Whosoever wishes to do justice to French architectural thought must consider its errors not as the shortcomings of ignorance, but as sophisms, the upshots of scientific though inaccurate deduction.

LAWRENCE HARVEY.

École des Beaux Arts.

THE FOREIGN GALLERY, PALL-MALL.

THE collection of pictures by French and Flemish artists now exhibiting in the Gallery, 120, Pall-mall, though small (219 pictures) is one of great interest, and includes several pictures of remarkable excellence and beauty. One of the most striking is M. L. Perrault's "The Orphans,"—a work of art full of poetry and pathos, and finished with the most minute care. It shows a group of girls, three in number; the eldest is attired in deep mourning, and surveys her sisters with feelings of extremest sorrow, while in her arms she carries a chubby-faced infant. Upon her shoulder rests the head of her younger sister, and the face, directed upwards, seems searching in hers for some gleam of comfort, while the right arm, thrown carelessly over the shoulder of the third, binds them together in a united family circle. The grief of each, differing in degree until it is lost in the happy repose of the sleeping infant, is admirably told, while the whole effect of the picture is such that it recalls one to again and

again gaze upon it. There are two small works by Meissonier, one called "Qui va là?" the other a "Halbardier on Guard,"—all life. "A Quiet Spot in the Forest of Fontainebleau," by Rosa Bonheur, displays the haunt of the stag beneath a canopy of foliage, where the earth is a carpet of moss and herbage, and the sunlight steals in, subdued by the intricate screen which nature has wrought with the green leafage. The picture is more truthful than effective. The "Burgomaster's Daughter," by M. C. Bisschop is a finished study. The light which breaks upon the head of the figure has a marvellous effect. "The Normandy Flower Girl," by M. J. Portaels, is also an admirable picture. "The Remedy," by L. Israels, tells its own story. The wife is stricken with disease; the husband, a French fisherman, sits by the bedside, with his daughter between his knees, gazing with earnestness upon the wan face of the patient to ascertain if the drug which the nurse has but just administered can have already worked a cure; while in the foreground a child, unconscious of the sorrow which hangs about the apartment, is sporting with the fishing-tackle that the father has thrown idly by. Of rare beauty is Merle's head of "Veronica." As a piece of manipulation it is not remarkable, but the expression is divine.

There are two small works by Edouard Frere, "Helping Herself," and "The Family Scrapbook." A group of little girls form a circle round the family treasure, and each face is alike expressive of the delight which the picture-book affords. The mother gazing fondly on her infant, by Jourdan, will be understood and appreciated wherever womanly graces and the innocence of children are welcome.

Pictures by Alma Tadema, Henriette Browne, J. Goupil, G. de Jonghe ("Playing from Memory"), Louis Gallait, J. Bertrand ("Virginia Drowned"), also demand notice; and even now we have omitted mention of two of the most complete works in the gallery, "Nonchalance" and "La Visite," both by Alfred Stevens.

Some water-colour drawings on the first-floor, serve to show what foreign artists are doing in that walk of art.

OWEN'S COLLEGE, MANCHESTER.

The design for the first portion of the new buildings for Owen's College is now complete, and the works themselves will shortly commence.

The site is about a mile to the south of the centre of Manchester, on the west side of Oxford-road. It is bounded on the north by Coupland-street, and on the south by Burlington-street. At its east or Oxford-road end, it is some 120 yards in width.

The original idea was to make the buildings surround a large quadrangle; but this idea has been modified, it being found that the cost of the work would exceed the means at the disposal of the committee; and it was considered by them that the present requirements of the College would be more conveniently met by the erection of a compact range of buildings, with space behind for less sightly, but not less necessary, structures, and in front for others of a more ornamental character, which will, doubtless, soon be required.

The design about to be carried out, and which we have now to describe, has been brought to maturity after long and careful consideration on the part of the committee and professors, in conjunction with their architect, Mr. Alfred Waterhouse. The scheme consists of a main block of varying width, and upwards of 300 ft. in length, set back about 200 ft. from Oxford-road, and running parallel with it. It is intended that this should ultimately form the western side of a quadrangle or court, 200 ft. in length, by 100 ft. in width. The three other sides will not be enclosed at present; but when the entire scheme is carried out, there will be a natural history museum on the south; a library, examination-hall, and other departments on the east (Oxford-road front), where the chief architectural features would be introduced; while to the north there would be space for additional lecture and class rooms, or for the medical school.

At the rear of the main block is a large space of irregular shape, averaging 200 ft. in width, on the south of which (Burlington-street side) the chemical laboratories will also be at once erected in a detached building, hereafter described, while on the north ample space will be left for an extension of the laboratories, if needed, for various subsidiary building, and for a gymnasium.

The main block, containing as it does the various lecture-rooms, class-rooms, &c., has been planned so as to secure the maximum of the three essentials,—light, quiet, and airiness. Wherever possible the class-rooms turn their back upon Oxford-road, which is always busy and noisy, while a wide corridor of communication runs along the building on that side. On the basement floor this corridor is unbroken; on the upper floor it is cut in twain in the middle by the library, on the first floor, and by a large arts' class-room on the ground-floor.

This division of the corridors has been devised, amongst other reasons, to prevent their being used too freely for general traffic. Each half is approached by a separate staircase entered from a porch on the east side. On special occasions, however, or whenever required, the whole of each floor can be thrown *en suite*.

In arranging the accommodation, one important consideration has been kept constantly in view. Inasmuch as the requirements of the college may vary,—one department needing an increase of space, another requiring less,—the rooms have been so arranged as to be put to different uses, if need be, without any structural alteration whatever being involved. As the full development of the scheme is reserved for the future, some ingenuity has had to be exercised to make temporary provision for wants which will be more adequately met when the whole of the buildings contemplated shall have been erected. Thus, one large arts' class-room, not required as such at present, will be used as a temporary library; another large room in the basement will form a temporary dining-hall.

The slope of the ground has favoured the arrangement of the basement story as planned. On the western side the floor is above the level of the ground; on the eastern side the rooms will look into areas 26 ft. wide, so that the story is practically entirely above ground. On this floor will be placed the engineering workshops and museums, the students' temporary dining-room and common room, the natural philosophy workshops, rooms for students' boxes, lavatories, cloak-rooms, &c.

The southern extremity of the building is devoted, on the basement and ground floors, to the chemical theatre,—a room 66 ft. by 40 ft. The professor's table is at the western end, on the level of the basement floor. The floor of the theatre rises eastwards, until it reaches the level of Oxford-road. This room will be lighted by windows on the south and west sides, all fitted (as well as those of the natural philosophy lecture-room) with iron shutters, to admit of the rooms being darkened at pleasure.

The other principal rooms on the ground-floor will be the engineering drawing-room and lecture-room, natural philosophy rooms, a large arts' class-room, with rising floors; the board-room, and secretary's office.

On the first-floor there are three large arts' class-rooms, professors' rooms (which, for the most part, are common rooms), the temporary natural history museum, temporary library, students' reading-room, and various small arts' class-rooms.

There is considerable accommodation in the roof, for which special uses will, no doubt, soon be found.

The chemical laboratories, in the separate building already mentioned, will form a block 95 ft. square. There are two large laboratories placed side by side, each of them 70 ft. by 30 ft. and 22 ft. in height. There are store-rooms below, and various subsidiary rooms adjoining the laboratories.

The professor's private laboratory is so placed as to command both the others, and there will be direct communication, by a covered corridor, between this laboratory and the table in the lecture theatre.

The dimensions of a few of the other rooms, and of the floors, may be interesting. The stories will be, except in special parts, of the following heights from floor to ceiling:—Basement, 15 ft.; ground-floor, 17 ft.; first-floor, 17 ft. 6 in.; rooms in the roof, 10 ft. The chief exception is the chemical theatre, which averages 28 ft. in height, and some of the large arts' class-rooms, which have been made about 22 ft. high, by a little scheming in the arrangement of the floors.

The four large arts' class-rooms are of the following dimensions:—One of them 40 ft. by 45 ft.; two 40 ft. by 33 ft.; and one 31 ft. by 35 ft.; that devoted temporarily to the library is 40 ft. by 45 ft. The students' reading-room is 34 ft. by 33 ft.; the engineering drawing-room, 52 ft. by 31 ft.; the board-room, 37 ft. by 30 ft.

There are in the buildings first to be erected 90 rooms in all, of which the chemical department takes 28; the natural philosophy, 9; arts' class-rooms, 9; engineering, 8.

Special care has been bestowed in maturing the scheme for warming and ventilating the buildings. In the sub-basement there will be hot-water boilers and a steam-engine; the latter to drive a fan for forcing fresh air (warmed in winter) into the corridor and lecture theatre. In the ordinary class-rooms there will be openings for ventilation above the doors, and all the windows will be double hung as sashes with a light above, hung on pivots, for summer ventilation, to open diagonally, so as to throw the fresh air upwards towards the ceiling.

The whole of the rooms will be warmed by hot-water pipes, but provision is made for the introduction of fire-places hereafter, if found desirable. Fresh air is also brought into the rooms behind the coils of hot-water pipes wherever practicable.

A special flue for the extraction of vitiated air will be taken from the ceiling of each room into large shafts in the roofs leading to ventilating turrets, in which steam cones will accelerate the draught.

Separate and particular arrangements have been made for warming and ventilating the chemical laboratories. A tower has been carried up above the roof, with large arcaded openings on each side, behind which a cowl will work, always presenting its mouth to the wind. This tower will bring a constant and ample supply of fresh air to the warming apparatus in the basement of the laboratory building. The smoke from this apparatus will be utilised for increasing the draught in the flue for the extraction of vitiated air. The warming of the laboratories will be effected like that of the other parts of the building, but from their own separate apparatus.

The style of the buildings, as might be presumed, is Gothic, of a collegiate and early type. The walls will be faced throughout with York stone, and the roofs covered with slate. The upper part of the central gable will be devoted to a clock-dial, and over the centre roof will rise a lofty flèche to be used for purposes of ventilation. A similar feature, but lower, will rise over the chemical lecture theatre. Square-headed windows are the rule, except in the corridors and staircases, where they are pointed.

Internally, the most interesting architectural features will doubtless be the staircases, which are arranged in large octagonal bays, 33 ft. by 14 ft., and cut off from the corridors by arcades of double columns.

The floors of the buildings throughout will be fireproof on the Dennet-arch principle.

OVERSIGHT IN THE TOWER SUBWAY.

If the Tower subway is to be the prototype, as we are told, of a new class of thoroughfares, it may be hoped it will, nevertheless, remain the only one with either *shafts*, *lifts*, or a *change of vehicle*, in so short a journey. To explain the exceedingly small necessity for any of these, let us first add to the quarter-mile of the present subway proper, the two shafts of 50 ft., and we find there are 1,420 ft. of way, all iron-lined, I believe, and about equally large and expensive. Now, suppose that same 1,420 ft., in one uniform tube, making an *eighth of a circle*, all castings from end to end on one model, the radius of curvature being everywhere 1,808 ft. The chord of this octant, or distance between entry and exit, would be about 1,391 ft.; carrying each, say 12 yards, further from the river than at present. If the river's width be 1,200 ft., the descent under each bank, till getting under water, would be some 36 ft., and the whole descent, to the middle, 139 ft., which would keep all well free from the bed materials, and down in the eocene London clay, and more so the greater the water pressure. Yet the single unchanged omnibus would emerge on a short level terminus *above ground*; and all inconvenience from the tilting to an inclination of 22½° at starting and arrival, would be obviated by making it in three or four separate bodies, each seating four, and hung on trunnions, so as to keep vertical. The utmost utilisation of gravity as motive power would also be made, by simply letting it acquire all the speed and run as far as

i would, which ought, with good wheels and rails, to be full seven eighths of the journey, when it would be caught by a clip, and pulled the remaining eighth by steam-power.

It is well known that without friction or resistance, the quickest way, or "*Brachystochrone*," from any spot to any other, would be part of a cycloid if the second point be lower than the first, or a whole cycloid if on the same level. Now, if you only cut from a cycloid one-eighth at each extremity, the remaining three-fourths contain practically *no* change of curvature, but so closely approach a *quadrant of a circle*, that the finest workman could hardly distinguish them. But the brachystochrone *allowing for friction*, is always less curved than the cycloid, and still *more* approximate therefore to a smaller circular arc than this was to a quadrant. Thus it is seen how very near an octant must be to the theoretically *very best* subway for economy of power. E. L. G.

THE TRADES MOVEMENT.

London.—Another meeting of the delegates from the carpenters' and joiners' societies in furtherance of the nine-hours movement has been held at the Duke of York Tavern, Lambeth; Mr. Sinclair in the chair. The delegates gave in their reports, showing the rapid progress of the movement. District meetings had been held at Brixton, Chelsea, Paddington, Finsbury, Marylebone, and King's-cross, and the new code of working rules had been well received at each meeting. After the transaction of provincial business, and appointing deputations to attend district meetings, the proceedings concluded. The aggregate meeting will be held shortly after Easter.

Barnsley.—The six months' notice, which was given by four of the master joiners in Barnsley to their men, to work one hour longer per day during the summer months, has expired, and a number of men have left their work. The masters who gave the notice were Mr. John Goodyear, Mr. John Carr, Mr. George England, and Mr. Thos. Jacques. The men up to the 31st of March commenced work at seven o'clock in the morning, and the masters are wishful that they should commence work every morning (except Monday) at six o'clock from the 1st of April to the 30th of September, and at seven o'clock every morning in the winter half of the year, leaving work at four o'clock on Saturdays. Some of the men refused to accept the change, and left work, but others still remain; and, seeing that the trade is anything but active, it is not expected that the dispute will continue long.

Edinburgh.—A correspondence as to the employment of unskilled labour in the painting trade has taken place between the operative painters and their masters. It was commenced by the workmen presenting a petition to the masters, asking them to put a stop to the system of employing unskilled labourers,—a system which, in the opinion of the workmen, was the cause of much annoyance both to them and their masters, and was also a source of injustice to the public. It was well known, the memorialists said, that many of the labourers referred to were in the habit of passing themselves off as journeymen, and this they felt did much injury to those who had served a full term of apprenticeship to the trade. To this the masters, through the secretary of their society, answered that they were quite able to manage their own affairs, and that the workmen had no right to interfere with their mode of conducting their businesses. They at the same time took the opportunity of denying that labourers were employed to do skilled work. The workmen, they thought, had themselves very much to blame for the state of matters that existed, they having refused to do certain kinds of work which they considered only suitable for labourers. The secretary of the operative painters, in replying to this communication, said that the workmen had not alleged that skilled labour was done by labourers. What they had said was that labourers were put to do work which painters should do, and which they did not object to do. They denied that they had any wish to interfere with the manner in which the masters conducted their businesses. As yet the masters have made no further communication on the subject.

Glasgow. — A conference meeting of the Glasgow master joiners and operatives has been held in the Religious Institution Rooms. Mr. Walter Bannerman on behalf of the former, and Mr. John Bennett on behalf of the latter, were appointed co-chairmen. A printed copy of the proposed working bye-laws, made out by the operatives, was handed to each employer present. After a friendly conversation, the employers intimated that they were empowered to propose that the whole matter in dispute should be submitted to an arbitrator appointed by Mr. Henry Glassford Bell, Sheriff of Lanarkshire, and that his decision should be final and binding on both parties. The operatives, on their part, stated that they had no power to refer the matter to arbitration. Mr. Bennett said that it had been spoken of amongst the operatives to reduce the working hours during December and January to eight hours per day, and five hours on Saturday. Each party agreed to submit the result of the conference to their respective bodies, with a view of arriving at an amicable settlement. A meeting of the joiners was held next day. After a long discussion, two resolutions were adopted, the first being:—

"That we consider the offer of arbitration made by our employers unnecessary, so far as our working hours are concerned, our time being our capital, and consequently our private property. No arbiter has the power to decide against the expressed wish of a man how many hours he shall work. Should our employers find it impossible to arrive at an amicable settlement with regard to wages or other matters connected with the present dispute, we are quite willing to accept arbitration in the way they have indicated."

Stirling.—A meeting of master builders has been held in Stirling for the purpose of considering a demand by the operative masons to have an advance made upon their wages of ½d. per hour from the 1st of April. All the master builders in the town were present. The circumstances of the trade were fully considered, and, after a discussion, it was unanimously resolved to refuse the demand.

Perth.—A meeting of the master masons has been held, at which it was unanimously resolved not to comply with the demands of the men, numbers of whom are daily leaving the town for other places in search of work. The men assert that the rise of wages sought, from 5½d. to 6d. per hour, would only place them on an equal footing with the workmen of other towns. No agreement has yet been made between the masters and journeymen masons with respect to the rate of wages. The masons employed on the Scottish Central section of the Caledonian Railway have resumed work, the railway authorities having raised the wages to 6d. per hour.

Arbroath.—Some months ago the operative masons in Arbroath resolved to begin the nine-hours system on the 1st of March last. Several did so, but as a number of employers declined to act on the new plan, it has been found necessary to return to the ten-hours system. At a meeting held the other evening, the operatives resolved to do this, but at the same time stated that they would renew their claim to have the working-day reduced to nine hours at the first opportunity.

ST. PANCRAS STATION AND ROOF.

IN the course of a paper on this subject, read at the Institution of Civil Engineers, by Mr. W. H. Barlow, Mr. Charles B. Vignoles, President, in the chair, the writer said,—

In arranging for the strength of the roof, as it was required that the arch should be capable of maintaining its own weight, without any intermediate connexions with the tie, it was considered expedient to adopt a low rate of pressure upon the metal, with a large assumed weight acting in addition to the weight of the principal. With this view the arch was designed so as to be capable of bearing an assumed load of 70 lb. per square foot measured on plan, in addition to the weight of the principals, with a stress on the metal not exceeding 3¼ tons per square inch; or, what amounted to about the same thing, a load of 56 lb. per square foot, with a stress of 3 tons per square inch. The assumed weight of 70 lb. per square foot on the surface carried by the arched portions of the rib, viz., 7,040 square feet, amounted to 220 tons; and, adding to this the weight of the open part of each arch between the springings, or 35 tons, the total load became 255 tons. The line of pressure formed an angle of 55° with the horizontal at the springing, and therefore the pressures were 155 tons at the springing and 89 tons at the crown. The sectional area of the upper flange of the rib was 23 square inches, and that of the lower flange of the rib also 23 square inches, so that the stress on the metal with the assumed weight of 70 lb. per square foot was 3·37 tons per square inch at the springing, and 1·94 ton per square inch at the crown.

The cost of the roof, as it stood in the finally settled accounts, excluding the screens, was 53,483*l.* The north screen and gable had cost 7,375*l.*, while a second screen and gable for the southern end, so as to separate the passenger station from the hotel buildings, had cost 8,507*l.* As the area within the walls measured on plan was 169,400 square feet, it followed that the cost per square of 100 ft. was, for the roof, excluding the screens, 31*l.* 11*s.*; for the north screen, 4*l.* 7*s.*; and for the extra rib and south screen, 5*l.*

The brickwork of the substructure of the station, and the whole of the works of the upper and lower lines of railway for a distance of three-quarters of a mile northwards, were let to the Messrs. Waring, and had been carried out under the superintendence of the author's principal assistant, Mr. Campion; while the iron-work of the bridges and of the lower floor of the station was in charge of his assistant, Mr. Grier. For the details of the roof the author was in a great degree indebted to Mr. Ordish. The Butterley Company were the contractors for the roofing and for the lower floor, Mr. (now Sir) G. J. N. Alleyne being their manager, and Mr. Clark their foreman on the works.

THE DRAWINGS OF THE HOUSES OF PARLIAMENT.

AT a special meeting of the council of the Royal Institute of British Architects, held on Monday, the 14th March, 1870, it was resolved,—

"That it having been referred to this council to advise a member whether he is bound to comply with a requisition to give up all the contract plans and drawings of a building (to which he had acted as architect), and all other papers necessary for affording a complete knowledge of the building, and of the works carried on in connexion therewith; the council express their most decided opinion that the rule and custom of the profession is, that all the drawings and papers of an architect, prepared for the purpose of erecting a building, are, and remain, the sole property of the architect."

IN the House of Commons a few nights ago, Mr. Tipping asked the First Commissioner of Works if it was true, as stated in the *Builder*, that he had demanded of the architect the drawings of the Houses of Parliament; and if he was aware that the Royal Institute of British Architects had declared that such a demand was not in accordance with professional custom, according to which such drawings are the property of the architect? Mr. Ayrton is reported to have said it was true that he had asked Mr. Barry to deposit in the Office of the Board of Works certain plans prepared by him for her Majesty's service and paid for by the public. It was also correct—at least he had been so informed—that certain architects had resolved that they were entitled to keep plans which they had prepared for other people who had paid for them. He had referred all the papers to the usual advisers of the Board, in order to ascertain what the rights of the Crown were.

Mr. E. M. Barry has since written:—

"I have just seen that the First Commissioner of Works stated, on Thursday night, in answer to a question, that 'he had asked Mr. E. M. Barry to deposit in the Office of Works certain plans which were prepared by him for her Majesty's service and paid for by the public,' and that he had placed the matter in the hands of his legal advisers.

As I have offered to comply with Mr. Ayrton's request, unusual though it be, to give him my drawings which I have prepared for the Government during an engagement which has now lasted ten years, I imagine some error must have occurred in reporting the above answer. It describes inaccurately the demand that has been made upon me, the nature and extent of which (and the peculiar circumstances under which it has been preferred) will be apparent when the papers which have been moved for on the subject have been laid before Parliament."

SIR,—The following is from the *Echo* of Saturday last:—

"We are heartily with Mr. Ayrton in his conflict with Mr. Barry. The waste of public money by the professional employment of non-official persons has been enormous. The Land Revenues, the Ecclesiastical Commissioners, and the Board of Works accounts are full of disgraceful warnings on this point. Mr. Ayrton has most properly placed the charge of the Houses of Parliament under the care of the salaried officers of the Board of Works, and Mr. Barry, who seems to consider himself as a sort of hereditary seneschal of the New Palace of Westminster, is offended. But the fight between Mr. Ayrton and Mr. Barry is, as we understand it, over the working drawings of the building. Mr. Barry says, that by the custom of the profession these belong to him, as inherited from his father. Then, we say, the sooner Mr. Ayrton, with the force of law, explodes such a custom, the better. If it is proved that the nation has paid for the work, and

has been charged with the cost of the material of those plans, they surely belong to the people. The constructive drawings of any building, whether they are claimed or not, certainly ought to belong, and by natural principles of equity do belong, to the individual who has satisfied the architect's charges."

I think it would be well for Mr. Barry to contest his right to the working drawings of the Houses of Parliament, now that it is the acknowledged custom, in and out of the profession, to consider the drawings of a building the property of the architect. At the same time, I do not think that architects, as a body, should stand by and see Mr. Barry, one of their number, victimised in the way Mr. Ayrton proposes; but they should come forward, and readily, with their money, if necessary, to defend a right long acquired by custom, and approved by the majority of employers. I, for my part, am willing to commence, with half a guinea, a subscription towards a fund for assisting Mr. Barry, should he be advised to defend his right to the drawings bequeathed to him by his father.

If, by the way, "the waste of public money by the employment of *non-official* persons has been enormous," why was the *official* Mr. Pennethorne discharged (as the public take it) to make way for Mr. Fergusson, and the *official* Mr. Fergusson to make way for Mr. Douglas Galton? This is a system which, I trust, as far as it affects architects' rights, will be withstood to the utmost.

I enclose my card. In case a subscription should be required, I trust some known member of the Institute would take the position of hon. secretary to the fund; should, however, no one be willing to come forward, I would act as hon. secretary *pro tem.* LUDOVICUS.

METROPOLITAN BOARD OF WORKS.

ARCHITECT'S SURVEYOR—ASSISTANT ENGINEER—MUNICIPAL GOVERNMENT.

At their last meeting the Board proceeded to the election of a surveyor in the Superintending Architect's Department, and eight candidates were submitted, from whom the Board were to elect one, and Mr. John Thomas Lepard was the successful candidate for that office.

A report was brought up from the Works and General Purposes Committee, stating that the committee had considered the letter from Mr. E. Cooper, assistant engineer, applying for a retiring allowance, and that they had ascertained, after conference with the engineer, that it will be unnecessary to fill up the vacancy occasioned by Mr. Cooper's retirement, and recommending that the services of Mr. Cooper be dispensed with, and that a retiring allowance of 400*l.* per annum be granted to him for life.

After a long discussion, in which several amendments were moved, the recommendation was put and agreed to.

A report was presented from a committee of the whole Board on Municipal Bills, stating that, in the opinion of the committee, it is desirable that there should be one central municipal government, with jurisdiction over the whole metropolis; and that there should be a readjustment of the districts into which the metropolis is at present divided for the purposes of local government; recommending that the subject be referred back to the committee for further consideration as to the details, with authority to communicate with her Majesty's Government thereon; and that the foregoing propositions be considered by the Board at their meeting on the 8th of April.

The report was received and adopted.

COMPETITIVE TRIAL OF STEAM FIRE-ENGINES AT GLASGOW.

An important competitive trial of steam fire-engines took place at Glasgow on the 18th of March. The civic authorities of that city issued an advertisement on the 1st of October last for a steam fire-engine, and two were offered to them, one being from Messrs. Shand, Mason, & Co., and the other from Messrs. Merryweather & Son, both of London. A competitive trial of these engines was then proposed and agreed to; and Mr. Conner, of the Caledonian Railway Company; Mr. More, hydraulic engineer, of Glasgow; and Mr. Bryson, the chief of the Glasgow Fire Brigade, were appointed judges. At the request of several correspondents, we print their report:—

"The engines having been taken from the fire-engine station to the weighing machine, fully equipped, were found to weigh (by certified report from weigher) as follows:—Shand, Mason, & Co.'s engine, 42 cwt. 3 qrs.; Merryweather & Son's engine, 48 cwt. 2 qrs. The engines were then placed in position ready for testing, their suction-pipes for drawing water being put in the river Clyde. To each engine was attached 280 ft. of delivery-hose, supplied by their respective makers. The nozzles were—for Shand, Mason, & Co.'s engine, No. 20, equal to 1 4-16 in.; Merryweather & Son's engine, No. 21, equal to 1 5-16 in. These branch pipes were then laid upon a frame erected for the purpose, both being at the same angle, and securely lashed to said frame. All being in readiness, the word to commence firing was given at 12 h. 51 min., and in 9 min. 45 sec. Shand, Mason, & Co.'s engine commenced working, with gauge showing 100 lb. pressure of steam per square inch. Merryweather & Son's engine commenced work in 10 min., with steam at 100 lb. pressure per square inch, as indicated by gauge. Both engines were then put under test No. 2, so as to show the greatest distance water could be thrown horizontally. During this test notes were taken repeatedly and accurately of the distances each engine was throwing the stream of water, and the result was, at the completion of the test (which lasted one hour), that on an average the distance attained by Shand, Mason, & Co.'s engine was 145 ft.—maximum, 149 ft.; Merryweather & Son's engine was 98 ft.—maximum, 112 ft.; the average pressure of steam being, for Shand, Mason, & Co.'s engine, 140 lb. per square inch—maximum, 150 lb.; Merryweather & Son's engine, 97 lb. per square inch—maximum, 140 lb.; and the average water-pressure for Shand, Mason, & Co.'s engine was 115 lb. per square inch—maximum, 125 lb; Merryweather & Son's engine was 96 lb. per square inch—maximum, 120 lb. The engines were then put under test No. 3, which was to show their action with the branch pipes set vertical; in this trial Merryweather & Son, with consent of Shand, Mason, & Co., altered their nozzle from No. 21 to No. 20 (small, equal to 1 7-32 in.), with the following results:—Shand, Mason, & Co.'s engine showed an average excess of height in the stream of water thrown over that thrown by Merryweather & Son's engine of 12 ft., the maximum being 15 ft. The average steam pressure during this trial (which lasted 20 minutes) being—for Shand, Mason, & Co.'s engine, 149 lb. per square inch—maximum, 160 lb.; Merryweather & Son's engine, 110 lb. per square inch—maximum, 140 lb. Tests 4, 5, and 6 were then combined by general consent, and arrangements made for each engine to throw two jets of water through the Glasgow Fire Brigade hose (four lengths to each jet), fitted with bayonet couplings and joints, the nozzles being all of a uniform size,—viz., ¾ in. diameter. The engines were then started simultaneously at 3 h. 13 min.; but the water pressure was so great that at 3 h. 15 min. (two minutes after starting), one of the hose attached to Shand, Mason, & Co.'s engine burst, and in 15 sec. thereafter Merryweather & Son's engine also burst a hose; thus bringing this trial to a close in 2 min. 15 sec. After these tests had been concluded, we subjected the engines to various tests, as to speed, power, &c., and also allowed the competitors to show the capabilities of their engines to the utmost. This being done, the trials were brought to a conclusion; and we have now to report as follows:—Boilers and fuel: both boilers are strong and well-constructed, admirably adapted for rapid steam raising and maintaining steam at a high pressure, as the foregoing figures indicate. The coal consumed during the trials was, for Shand, Mason, & Co.'s engine, 8 cwt.; Merryweather & Son's engine, 9 cwt. 0 qrs. 21 lb. We may mention, however, that Shand, Mason, & Co.'s had a stoppage for 1 min. 40 sec., which will somewhat reduce the apparent advantage over Merryweather & Son's. As we do not deem it necessary to trouble you with mechanical details, we avoid entering into any description of the respective engines, but in passing may say that Merryweather & Son's has two direct-acting pumps—Shand, Mason, & Co.'s having three. This gives the latter the benefit of a more continuous stream of water, and greater regularity in working; and whilst both engines are good specimens of engineering, we are inclined, in accordance with the results indicated in the former part of this report, to give, after due consideration, our decided preference to Messrs. Shand, Mason, & Co.'s engine."

The Watching and Lighting Committee, to whom this report was made, expressed approval of it, and recommended that the engine of Messrs. Shand, Mason, & Co. should be purchased, and the minute of the committee to this effect was unanimously adopted at the meeting of the Police Board held on Monday last.

THE NEWTON MARKET COMPETITION DESIGNS.

The local board of Newton have selected the designs furnished by Mr. John Chudleigh, of Exeter, bearing the motto of "Perseverance," and by Mr. James Chenhall, of Newton Abbot—"As you like it"—for the premiums of 25*l.* and 15*l.*, as being the best two designs for the new markets. The whole of the designs sent in have been submitted to public opinion, which was pretty strongly expressed in favour of those furnished by "Common Sense" and "Atlas."

"Perseverance" (Exeter) arranges the buildings in two blocks, the axis of the larger being parallel to the old market buildings. The corn exchange occupies the west end, and the principal entrance into the market is through it, the door having a bell-cot 30 ft. high over it. The walls are to be built with limestone, with granite and Bath stone dressings. The roofs are supported internally on iron columns 12 ft. high. Estimate, from 3,780*l.* to 4,300*l.* This obtained the first premium.

"As you like it" (Newton Abbot), second premium, places the corn exchange opposite the Bradley Hotel, and the markets are entered through an adjoining arcade with shops. All the markets are in a block, and open to each other, the fish-stalls being at no great distance from the butchers' stalls. The roofs have iron trusses, covered with slates, and every third principal is supported by an iron column, the intermediate principals being carried on "Warren girders." The ends of the five roofs are filled up with plain flat gables of limestone, on an entablature supported on pilasters, and have a very strange appearance. The new road from Courtenay-street is continued across the Lemon on a bridge, the abutments being built of brick, each abutment having seven counterfoils carried up their full size to the top level of the abutment, which is made sufficiently strong to resist the thrust of an arch of 40 ft. span, but supports seven wrought-iron girders, 17 ft. 1 in. span, and 18 in. deep. The author calculates the cost, including the bridge, at 4,900*l.*

"Common Sense" (Torquay) supplies a design which has attracted, as already mentioned, attention. The chief elevation faces Market-street, the entrance into the markets being in the centre, with a handsome clock-tower over it. On one side of the entrance is the corn exchange, and on the other three shops. He also gives a perspective view of the great hall, which is 45 ft. in span, and 170 ft. long, and has its roof supported on laminated plank ribs. Estimate, 5,000*l.*, the sum named by the Board.

"Atlas" (London) has taken great pains in getting up his design, which shows a road leading from Market-street to the new approach-road from Courtenay-street, midway through which is an octagonal open space, with the markets ranged around it. The plan could be adapted to the ground by a slight alteration. Estimate, 3,960*l.*

Sir,—With reference to this competition, I think it right to mention that rumour states the first premium was awarded to the son of a member of the local board (and I believe a *pupil* in an architect's office); the second to a local man, who also is said to have influence on the board.

One of the Competitors.

MANAGEMENT OF COMPETITIONS.

MADELEY WORKHOUSE.

The author of the design for the proposed new workhouse in Madeley, Shropshire, placed second, complains that while the instructions pointed out that economy in erection was a point to which the guardians attached special importance, they selected a design, the cost of which was estimated at 600*l.* or 700*l.* more than that of any other submitted: further, that, while the instructions said, "one perspective view of the exterior may be sent in tinted only in sepia or Indian ink," the authors of the selected design forwarded "a highly-coloured perspective." The correctness of these statements is denied by the Clerk to the Guardians; but, admitting it to be proved, it is clear to us Mr. Griffiths could not sustain at law any claim for compensation. The guardians by the instructions issued bind themselves to nothing. As to the coloured perspective, they might say it was not looked at. The permission they gave to each competitor to send in one perspective view tinted only in sepia or Indian ink did not compel each competitor to send in such a view, and the coloured perspective not being what was admissible, was turned, they might say, aside. The discredit (we are, of course, supposing the assertion correct) would rest in such a case on the competitor, who, in face of such an intimation, should seek to steal a march by sending in a coloured view. Architects should look to the instructions and stipulations before they compete, and decline to send designs except under proper arrangements. As it is now, they go in on the mere chance of a "toss-up," and often find they do not get even that, the toss having been settled against them before they began the game.

IN PARLIAMENT.

The Government Offices.—In reply to Lord Redesdale,

The Marquis of Lansdowne stated that it was intended to proceed with the buildings in Downing-street this year, and 8,000*l.* would be voted for the purpose, this amount representing the maximum extent of the buildings which could be erected within that period. There was every desire to push on the work, but it was impossible to complete so large a mass of buildings as that eventually to be completed, in one year. Arrangements had been made for the purchase of the whole of the houses in King-street and Parliament-street required for the extension of the public offices, the greater part of the purchases having been already concluded, and 18,000*l.* which appeared in the estimates this year representing the whole of the outstanding purchases. A design for the extension of the buildings was placed in the library of the House of Commons last session, and would, if the noble lord wished it, be placed in their lordships' library for inspection. With regard to the house fronting St. James's Park (to which satirical allusion had been made), it was built on Crown property, but no additional land had been inclosed. The property of the Crown was bounded by an iron railing, and this had not

been removed. It was under the control, not of the Board of Works, but of the office of Woods and Forests, and it was within their competence to approve designs of buildings, including the projecting bay window to which the noble lord alluded. — Lord Redesdale wished to know whether there was any design for the utilisation of the ground in Charles-street.—The Duke of Argyll said part of this site belonged to the Indian Government, which contemplated the erection of a museum there. The present museum building was very inadequate, and it was increasingly important for the exhibition of the commercial products of India to erect a better one. In the present state of Indian finances, however, no money could be spared for this purpose.

The Wellington Monument.—Earl Cadogan moved for copies of any correspondence which might have recently passed between her Majesty's Chief Commissioner of Works and the surveyor of St. Paul's Cathedral, with reference to the monument to the late Duke of Wellington, in course of erection in that church; a return of copy of agreement entered into between the Board of Works and Mr. Stevens, the artist selected to execute the work; payments made to Mr. Stevens on account of the work itself, or to others for purposes in connexion with it; dates of payment; sum originally voted by Parliament for the erection of the monument; and balance remaining available for the completion of it.—The Marquis of Lansdowne said the Government would not object to the return if the noble lord pressed for it, but it being expected that the work would be completed within a year, and it being probable that the original terms would not be adhered to, it would be better to await its completion before entering on an inquiry into the mode in which it had been carried out. The motion, however, was ultimately agreed to.

The New Refreshment Rooms.—The House of Commons committee met on Wednesday and adopted the Board of Works' plan for the alteration of the rooms adjoining the library (in opposition to that proposed by Mr. Barry), so as to fit them for dining and refreshment rooms for both Houses. The works will be proceeded with in August. Mr. Barry applied to be heard in evidence by the committee, but his offer was declined, on the ground that the committee had to judge of plans, not to hear witnesses.

THE ARTS AND THE INTERNATIONAL EXHIBITION OF 1871.

PRINCE CHRISTIAN presided at a conference of artists, sculptors, decorators, and others interested in the fine arts, held on Wednesday, at the Society of Arts, to consider the representation of the fine arts in the forthcoming series of annual International Exhibitions.

His Royal Highness, in opening the proceedings, said—The special object of these fine arts exhibitions is to show how closely high artistic culture can be connected with works of industry. In modern times we have lost sight of this intimate alliance between art and industry, which was characteristic of Mediæval and ancient days; and what we are now aiming at is a revival of this wholesome alliance. We hope that these exhibitions will encourage the education of artistic talent in the direction of objects of utility of every description. Many instances may be quoted from history to show that it was not beneath the dignity of the most illustrious professors to combine the useful with the ornamental. Michelangelo was a sculptor, painter, and architect; so was Raffaelle. Leonardo da Vinci was an engraver, an architect, and painter; Francia was a goldsmith, engraver, and painter; Cellini was a goldsmith and sculptor; Holbein an architect, painter, and designer; Albert Durer a painter and engraver. Surely these great examples must stimulate people to the culture of arts in our own days.

Col. Scott explained very fully the details of the arrangements contemplated; and a discussion ensued, in which Mr. Redgrave, R.A., Mr. Millais, R.A., Mr. Henry Cole, Mr. Fahey, Mr. Stevens, Professor Hayter Lewis, Mr. Godwin, Mr. Hyde Clarke, and others, took part. On the motion of Professor Westmacott, R.A., seconded by Mr. Carter Hall, it was resolved—

"That this meeting, after having had explained to it the object of the intended international exhibitions, so far as relates to the section of fine arts, desires cordially to co-operate in carrying into effect the plans proposed."

The Lord Chancellor made an interesting address in moving a vote of thanks to the chairman, which was carried unanimously.

We understand that Col. Scott has received a letter from Brussels, in which it is stated that a commission has been formed in Belgium, under the presidency of the Count of Flanders, for the purpose of organising a display of specimens of Belgian handicraft, to be included in the forthcoming International Exhibition to be held in London.

PROPOSED CATHEDRAL, BRITISH COLUMBIA.

STEPS are now being taken for the rebuilding of the cathedral at Victoria, the capital of British Columbia, which cathedral was recently destroyed by fire. The Bishop of Columbia, who is on a visit to England, is endeavouring to raise sufficient funds, in addition to what has already been obtained, in order to commence the cathedral at an early date. The Rev. Perceval Ward, rector of Compton Vallence, Dorset, a relative of the Bishop of Columbia, has promised to make a donation of the drawings of the proposed cathedral, which are now in course of preparation by Mr. Ferrey, F.S.A. In plan the edifice, in its entirety, will consist of a nave 96 ft. by 28 ft., with span-roofed aisles, 25 ft. wide; choir, 42 ft. by 26 ft., having twelve stalls. The sacristy, 24 ft. by 16 ft., and the organ-chamber, will be on the north side, and the seats for the governor of the colony in an aisle on the south side of the choir.

Owing to the prevalence of heavy western gales there will be no doors to the west, but the principal entrance will be by a large south porch. The tower, which is intended to be of lofty proportions, will stand at the south-west angle of the nave. When complete the cathedral is intended to afford accommodation to about 1,200 persons. The style adopted will be transitional between Early English and Decorated, sufficiently modified to suit the requirements of the climate.

PROFESSOR SCOTT ON VAULTING, AT THE ROYAL ACADEMY.

LECTURE III.—*concluded.**

I HAVE hitherto dwelt wholly upon vaulting which has none but what I have termed *functional* ribs;—that is to say, such as have a specific utility; as transverse ribs to mark the boundaries of the bays, and to strengthen the vault in its main span; diagonal ribs to fortify the angles of intersection; and wall-ribs to support the vaulting surfaces at their junction with the walls; and occasionally ridge ribs, though these more properly belong to the succeeding stage. The next stage in the history of vaulting is that in which other than merely functional ribs are made use of,—intermediate ribs, in fact, to subdivide the spaces between those used during the previous period.

In square vaulting, *one* such additional rib is usually introduced in each space. In very oblong vaults *two*, and even *three*, were often introduced in the side spaces, though only one in the middle spaces. It is clear that this addition necessitates the use of ridge ribs, as, without them, the point at which the intermediate ribs meet at their apex would want abutment. So reasonable, indeed, was this motive, that we often find the ridge rib to have been omitted between the intermediate and wall ribs, because there its use ceases.

One thing which followed the use of these additional ribs was the curious serrated plan of the filling in. The oblique position of these ribs would, if the plan of the filling in remained unaltered, cause the fillet or reveal of the rib nearly to vanish on one side, and to become very wide on the other. This led them to change the plan.

On looking at the top surface of vaulting where the ribs are visible, it is at once seen that this was also necessitated by a structural cause, as without it the filling in would not rest well upon the ribs.

No better specimen of this form of vaulting can be referred to than that of the Presbytery at Ely, built about 1240 to 1250, and the four bays immediately to the west of the crossing in Westminster Abbey, erected by Edward I. about 1280 to 1300. The latter is the more perfect, as having level ridges. The former, curiously enough, having ridges to the side cells which rise from the intersection towards the walls. I may mention that it is very common for vaulting with intermediate ribs to have ridges rising rapidly towards the central boss.

* See p. 240, *ante*.

The use of these additional ribs became, from the latter part of the thirteenth century, rather the rule than the exception.

I may mention early specimens of it at Chester, both in the Chapter-house and in the Lady Chapel, the latter with raised ridges; but in each the addition being only in the side cells. The Chapter-house at Wells has the intermediate ribs added throughout to those of the more normal examples at Westminster and Salisbury giving its vaulting a peculiarly full and rich, though rather crowded, effect. Bosses are usually introduced at all points of meeting, adding greatly to the richness of the whole.

Though I have called these ribs *non-functional* such is the case only in a limited sense, for, though not necessary, they nevertheless do their work: they divide and strengthen the vaulting spaces, and tend to do away with the necessity (if such may be supposed to exist) for any great thickness of filling in. They form, in fact, a stone framework or centreing, with frequent supports on which the vaulting permanently rests. Nearly the whole of Exeter Cathedral is groined in this manner, and excellent specimens, though of rather late date, may be seen in the west and south walks of the cloisters of Westminster Abbey, and in the two vestibules through which the cloister is approached. These have the advantage of close proximity to the eye, which enables one to study them with facility.

The next step in the history of vaulting may be said to be wholly decorative in its motive. It is the addition of short cross ribs between those already described, and arranged in patterns, such as stars, &c., round the central bosses, adding much to the complexity and ornamental character of the vault, and making a further increase to the number of the bosses.

Wonderful skill is often evinced in the arrangement of these patterns, which, traversing the changing planes or surfaces of the vaulting, produce in the perspective an extraordinary diversity of effect. These ribs have received from Professor Willis the name of "Liernes," a term given by Philibert de l'Orme to the ridge-ribs (perhaps in common with these), but, as we are short of an English name for these cross-ribs, it comes in conveniently to our aid. The term means, I believe, in carpentry, a short joist or rail, serving as a tie to steady other timbers, which is very appropriate to its use (real or apparent) in vaulting.

We have a few excellent specimens of this class of vaulting in London; more particularly that of the St. Stephen's Crypt, and of a bay of the cloisters opposite the entrance to the chapter-house, both erected in the first half of the fourteenth century.

In the former both the intermediate ribs and the liernes are very subservient in size to the main ribs; which gives an excellent effect: indeed, I know of no work more studious in design and detail than that piece of vaulting.

The vaulting of three bays of the eastern limb of Ely Cathedral, built by Alan de Walsingham at about the same period, is also of excellent design, as is that of the chancel of Nantwich Church, in Cheshire.

I am imitating the last-named to a certain extent in timber in the vaulting of the nave of Chester Cathedral, where, though the springers exist, the vaulting has never been completed.

Liernes are not placed at right angles to the surface of the vaulting, but in a vertical plane; perhaps from the facility it affords for setting them out on the ground plan.

We find the same cause regulating the geometrical system adopted for setting out the stones forming the bosses, which had also to contain a short piece of the impinging ribs. Professor Willis, in his admirable papers on vaulting, gives in minute detail the method adopted, showing that, to facilitate the operation, they made the upper surface of the boss-stone *horizontal*, to serve as a sort of drawing-board on which to draw the plan of the intersecting ribs. I have tested this in several instances. In the western part of the nave at Westminster, there being no outer thickness of stone vaulting, the boss-stones appear, and their surfaces are horizontal. On sweeping away the accumulation of dust and rubbish which covers them, I found, sure enough, the centre and side lines of all the ribs carefully drawn upon them.

In the lierne vaulting at Ely, though there has been an outer thickness of stonework, it was cleared away in the last century for the sake of lightness, so that the boss-stones, once concealed, are now visible. On clearing them from obstructions, I again found, as at Westminster, the

lines of the ribs (here much more complex), carefully set out upon the top of the stones. Each of these little stone tables, in fact, has drawn out upon it the bit of the full-size plan of the vaulting which its surface would contain.

The lierne vaulting, though commencing as early as the first quarter of the fourteenth century, was so popular as to be continued throughout the remaining periods of Gothic architecture, used side by side, and often in union with other and later systems. The same was naturally the case with ordinary rib vaulting, so that in later times we have at least *three* systems used contemporaneously.

I know of no specimens of lierne vaulting more charming than what we see in the oriels of the halls of Crosby Hall and Eltham Palace, two sister works, unquestionably the work of the same architect, in the reign of Edward IV. They are of different plans. The one consists of five sides of an octagon, the other of a double square. The latter is on the system I have mentioned as having its central compartment raised like a square dome, to allow of the passage of the arch by which it opens into the hall. Both are carried out with the depressed arch belonging to their late period, and are treated with exquisite care and taste.

At Gloucester, in the choir, and Winchester, in the nave, this manner of vaulting assumes a very peculiar form; the side cells falling in at a low level, as what are called "*Welsh*" groins, leaving a width of barrel vault above, which is richly decorated by surface ribs and liernes.

That at Gloucester is a work of extraordinary magnificence. Its great speciality lies in its having two sets of diagonal ribs, the one on the ordinary system, the other comprising two bays each, and by their intersection defining the position of the *Welsh groins*. Thus the whole of the ordinary diagonal ribs, and half of the others, become mere ornamented mouldings on the surface of the barrel-vault, while to them is added a vast network of liernes, cutting it into an infinity of panels, whose angles are marked by a perfect army of carved bosses. The same was imitated at a later period in the lady-chapel.

In many cases, as in the western portals at Winchester, the upper portion of the groining assumes forms in which the lines of the true ribs seem almost forgotten. This is done to a very vicious extent in the choir at Wells. I may mention, as a late but beautiful example of this manner of vaulting, that of an exquisitely beautiful chamber adjoining the cloister at Windsor.

During this period two practices crept into use, to which it is not easy to assign precise dates, but which worked great changes in the art of vaulting. The one is the use,—especially at first for diagonal ribs,—of a curve drawn from two centres, which gradually brought down the aisles to excessively low proportions. The other practice was the use of portions of the same curve for several, or even all, of the ribs, either throughout their height, or at least for their lower part. The first-named custom was very natural in cases where the height of the vaults was limited by circumstances, as in St. Stephen's crypt. The diagonal ribs here were struck from three centres to the double rib, and in the next ribs from two to each single rib, and were also slightly segmented; that is to say, that they made an angle with the vertical line. They may be said to be a sort of imitation of the ellipse, as also is the case with the diagonals of the south and west cloister vaulting at Westminster.

The other practice, *i.e.*, the repetition of the same curve for different ribs, is very curious and important in its results. It influenced in an extraordinary degree the *plan* of the vaulting at its intermediate heights. Professor Willis has called special attention to these half-height plans, as a matter of much importance to the effect.

If vaulting were carried out on perfect theoretical principles, and with the level ridge, these plans would be *rectangular*. The mere substitution of circular curves, unless made a little segmental, softens the angle of the square, while any modification of these curves produces its effect, one way or another, on this half-height plan. Professor Willis has illustrated this in a very interesting manner from the variations found in the cloisters at Norwich; a work generally of uniform design, but which, having been carried out at several different periods, the habits of the masons had undergone changes which produced very curious effects in this respect.

I may mention that where the ribs are of the same curve the ridges cannot be level; but that the use of the two-centred curve enabled them to repeat the same curve for the springers, but slightly to change it above by varying the position of the centre, from which the upper part of the curve is struck, so as to make the ridges level where it was desired.

This tendency to the repetition of the same curve led to the development of a most remarkable variety in vaulting, which especially characterised its later history in this country. I allude to that extraordinary form known as *Fan* vaulting.

It is self-evident that if a number of ribs of equal curvature spring at equal angles from a single pillar, the plan of the vault at any level will be a circle or a portion of a circle; and that they may be bounded at the level of their apex, or at any other level, by a circular moulding forming the whole into a figure, which I have had occasion to mention as having been generated at a very different date and from another cause, in the Norman vaulting of the circular Chapter-house at Worcester: a figure which I have defined as a concave-sided conoid, and likened to the flower of a convolvulus.

Now, the vaulting of any space, if set out in square compartments, and having ribs of similar curvature and at equal distances, may be formed into a number of portions of this figure by merely drawing semicircles and quadrants, as the case may be, from apex to apex of the surrounding arches.

A remainder of the ordinary vaulting, with rising ridges, exists, however, above this extemporised fan, and the whole has to be dealt with artistically on a system suited to the new form.

The general idea of such treatment of a fan or conoid may be said to be parallel to that of a circular or rose window. The ribs are viewed as radiating mullions, and are made to multiply in number as the circle expands, and usually to terminate round the outer boundary with a series of tracery forms like the heads of two-light windows. A good rose-window of late date, if imagined to be elastic, and drawn out from its centre into a conoidal form, would make a good compartment of fan groining; or a groining fan compressed into a plane would make a good rose-window. The interstices between the fans are filled up in various ways; either by circles of somewhat similar design, which sometimes drop down in little pendent fans, like stalactites from the roof of a cavern; or with a number of circles fitted together; or by continuing the diagonal ribs to their intersection with the ridges, and filling in the triangular spaces with tracery.

It is not, however, essential that the compartments so dealt with should be *square* in plan. If *oblong*, the semicircles or quadrants are drawn from the apex of the narrower and lower arches; and from the same centres portions of circles are drawn from the apex of wider and higher arches, assuming the form of an additional or outer zone of a rose-window, and intersecting on the line of the cross ridges, and thus forming a portion cut out of a great fan. Or the roof may be described as being formed of very large fans intersecting one another. Such is the famous roof of King's College Chapel, at Cambridge, but the frustums of fans are there bisected by vast transverse ribs, which were, no doubt, required for strength owing to the great scale of the vaulting.

The earliest instance which is known of fan vaulting is in the cloisters at Gloucester, dating from the beginning of the fifteenth century; indeed, Professor Willis thinks the invention due to a school of masons there. It, contrary to the usual practice, is formed with simple arches, instead of four centres. Each fan has but the transverse and wall ribs at its springing. At the next stage it forms the diagonal, then two intermediate ribs, and finally four more on each side of the transverse rib, and ends in little two-light window-like heads, while the space above is filled with four large cusped arches, and as many pear-shaped figures.

The limits of my lecture will not permit me to follow up this part of my subject as its importance demands; and my means of producing illustrations (for which I have heartily to thank several zealous and talented gentlemen engaged in my office, as well as one of my sons) have exhausted themselves before this laborious phase is reached. I have also to thank Mr. Herbert Poole, of Westminster, and Mr. Kabey, the clerk of works at the Chapter-house, for some most elaborate measurements of portions of the groining of the Abbey, which, if ever I publish these lectures, I hope to do justice to, but which were too much in detail for my present purpose. I must, therefore, content myself with referring to some of the most prominent examples.

I have already referred to the Gloucester cloisters and King's College Chapel.

I will next mention the central compartment or crossing of St. George's, Windsor, a most magnificent treatment of an oblong space. The aisles of the same chapel, with the smaller chapels adjoining, are charming examples, as are the aisles and small chapels of Henry VII.'s Chapel, and the cloisters of St. Stephen's, Westminster. Bath Abbey and Sherborne Minster are thus vaulted, and a whole century later, appearing long after date, comes the beautiful ceiling, or the staircase to the hall, at Christ Church, Oxford;—a square space groined on a central pillar.

In the construction of the vaulting of these later periods, we have a curious instance of the manner in which extremes meet. In the earliest specimens of vaulting, all the strength lies in the vaulting surface itself. As time went on, ribs were introduced, one after another, to strengthen and support it, till at length they amounted to a permanent framework of stone, centreing on which the vaulting surface lay.

Now, at length, time has its revenge, and the extreme multiplication of ribs led to the loss of their uses; the whole, or nearly the whole, being cut out of the same blocks with the panels; and thus the original system was reverted to; the vaulting surface becoming again the entire structure, and the ribs and panels simply cut as ornaments out of its substance.

The most remarkable production of the fan system of vaulting is the gorgeous central roof of Henry VII.'s Chapel, a work in which ingenuity, perplexity, and beauty are united in the most wonderful manner which can be conceived.

Though it stands quite alone in point of intricacy and magnificence, it is not the first instance of the use of the peculiar system on which it is founded. How Fuller could have attributed its origin to the foreign studies of the King and Bishop Fox it is difficult to conceive; for, not only is fan groining itself a purely English invention, but the special system of *this* roof has, so far as I know, only English prototypes.

The earliest of these is the vaulting of the Divinity School, at Oxford, finished about 1480. This was subsequently imitated, though with the loss of its leading principle, in the choir of the cathedral (then the church of St. Fridewid's Convent in the same city), a work which, though popularly attributed to Wolsey, is probably of earlier date.

I have often looked in vain for the leading principle on which this wonderful work was designed. Its *construction* is plain enough; the difficulty is the ideal of its *design*. Like everything, however, which is founded on reason, its idea once perceived, it becomes perfectly simple, and one only wonders where the difficulty lay.

It was simply as follows:—First imagine, for argument's sake, that the architect had intended to divide his space into three spans—a wide and two narrow ones—like the Lady Chapel at Salisbury or the crypt of the Sainte Chapelle at Paris, supporting the vaulting on ranges of thin pillars. The setting out of the divisions was about the following. The whole span being divided into five parts, two were given to the width of a bay, one to the imaginary aisle, and three to the central span. The vaulting of the aisles, then, would be in oblongs of double their width *set lengthway* of the building, and the central span in oblongs half as long again as their width *set crossway* to the building.

Let us apply to each the rule I have already laid down for the fan vaulting of oblongs. Beginning with the ideal aisles, from the pillars and responds and centres draw the lower circles of the fans reaching the apex of the *narrower* arches, and the upper circles reaching the apex of the *wider* arch. This gives us an oblong fan vault in its most normal form.

Then do precisely the same with the wider or central span, and our space is covered with oblong fan vaulting of the most usual kind. Now, as the lower arch of the central span is identical with the higher arch of the side spans, it follows that the fans in the sides (or aisles) are continued and completed in the central vault, the lower arch of the small vault being also continued round to complete the design. The decoration of the smaller fans then is in *two* stages, and that of the larger ones in *three*; but, the design of both being continuous, the one is only an extension of the other.

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Had the architect stopped here, no system of vaulting, on the fan principle, or space so divided, could be more systematic or more simple in its ideal.

He had no thought, however, of stopping at so common-place a stage, and his pillars were designed only to do their work on paper and then to be erased. The columns were omitted, and their places supplied by pendants; but, as such a roof could not stand for a moment, something must be done to supply the support which the pillars would have afforded.

This was effected by the introduction of strong transverse arches crossing the whole chapel, and springing much lower than the vaulting. These crossed the narrower spans, striking arbitrarily into their fans, and uniting themselves with the central vaulting.

In the Divinity schools these great arches show themselves throughout, as the supports of the otherwise helpless vault; but in Henry VII.'s chapel they are visible only in the side vaults, which are strutted up from them with strong tracery; but their upper portions penetrate the central vault, and become concealed from view.

The same system is carried into the apse, and that with the most surprising skill. The apse is supposed to be a portion of an entire octagon, with an aisle supported by eight small columns, of which two are lost by its conjunction with the straight part of the chapel. These columns being converted into pendants, the structural arches supply, as before described, the support demanded; but in this case they converge to the central part of the octagon.

The treatment of this point in detail cannot intelligibly be described in words. It is, perhaps, the most consummately skilled piece of designing to be found in the whole range of Mediæval vaulting.

I have now completed my running, and all too rapid, sketch of the arched and vaulted systems of Mediæval architecture, though purposely leaving to another occasion the subject of domes. The limits of three lectures have only sufficed to give a somewhat cursory glance at its salient points, leaving the treasures of its detail to be searched out by the zealous student.

No subject in the whole history of architecture is so remarkable, or would more richly repay the investigator. I commend it to your individual study, and will only add that our own country is more rich in the variety of its vaulting than any other, and that London is especially well supplied with objects of study, containing, as it does, excellent examples of nearly every variety of vaulting, from the stern severity of the work of King Edward the Confessor in the substructures of his monastic buildings at Westminster, to that gorgeous and astonishing work which I have just been describing, and of which we may boldly assert (whatever may be our individual preferences), that *the world does not contain its equal.*

BELFAST TOWN-HALL AND MUNICIPAL BUILDINGS.

THE works for the new municipal buildings in Belfast, Ireland, are being energetically carried forward; the courts will probably be finished in May, and the whole completed in little more than a year from the present time.

The plan comprises, besides council-chamber and corporation offices, a recorder's court, custody and summons courts for magistrates, and the necessary offices in connexion with them; prisoners' cells and charge-office; police-barrack for sixty-four men, with stables, district stores, &c.; fire-brigade station for six engines, with superintendent's house and stables.

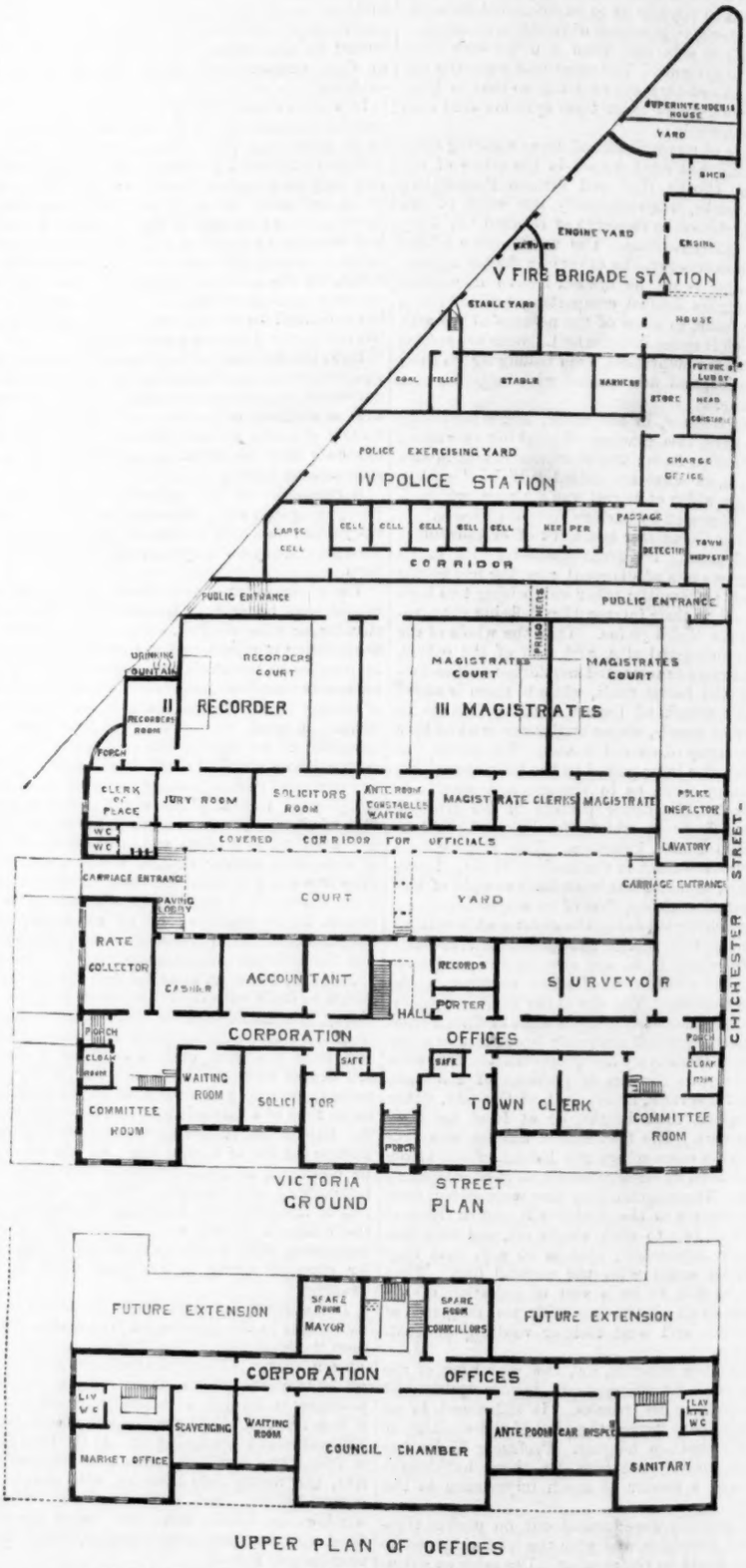
The material is perforated brick, from Ravenhill; and the freestone dressings are of red stone, from Dumfries.

The site is adjacent to the proposed Central Railway Station, and at the junction of Victoria-street and Chichester-street, from which point the view is taken.

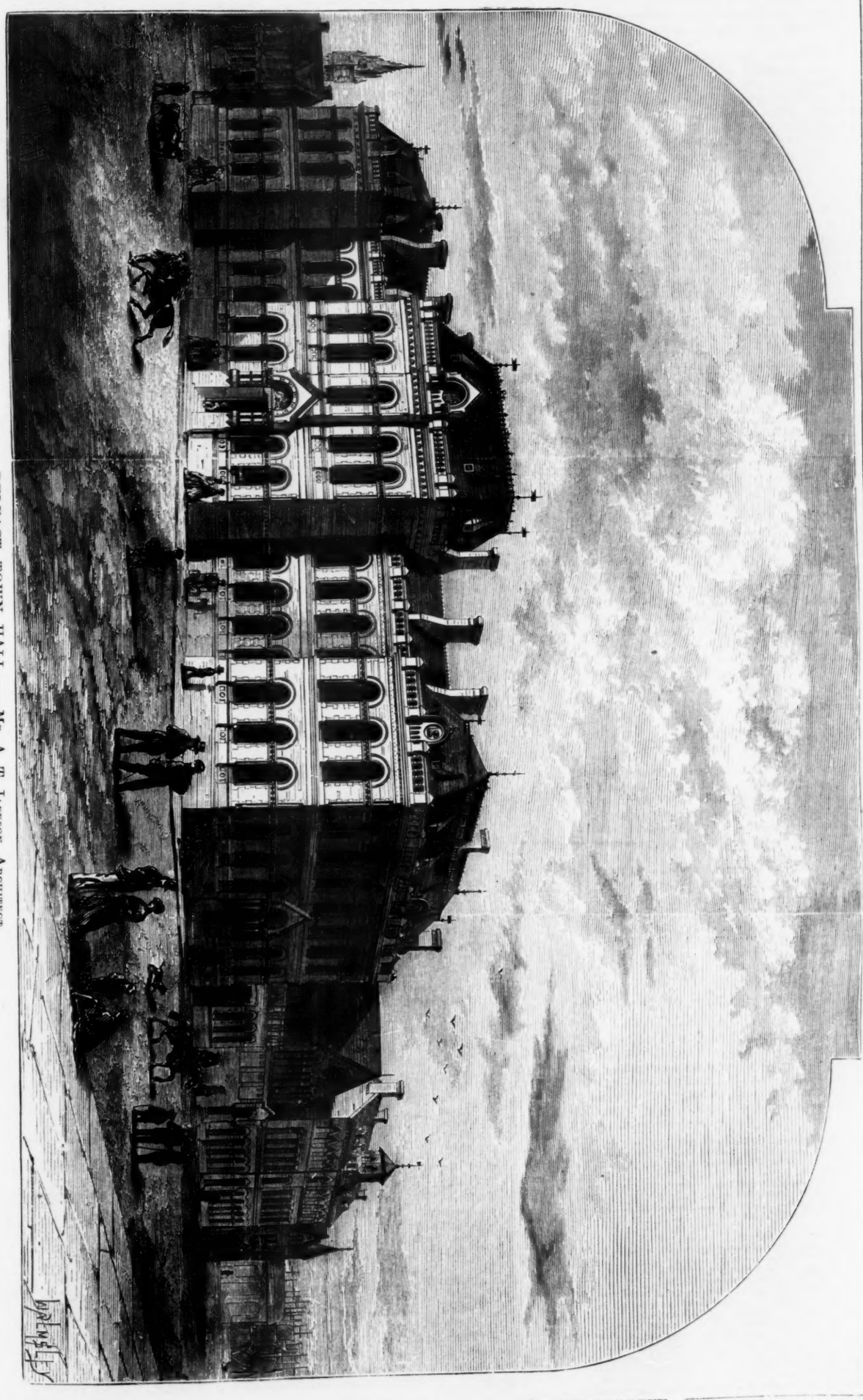
The design is that selected in the competition of January, 1869, but our view shows the additional building required subsequently to the contract plans to form the central police-barrack of the district, and a tower for the fire alarm-bell.

The contract was taken at 16,000*l.*, by Mr. James Henry. This was the sum stipulated in the instructions to competing architects, but the additional building will most likely increase the total outlay to 20,000*l.*

The architect is Mr. Anthony Thomas Jackson, of Belfast.



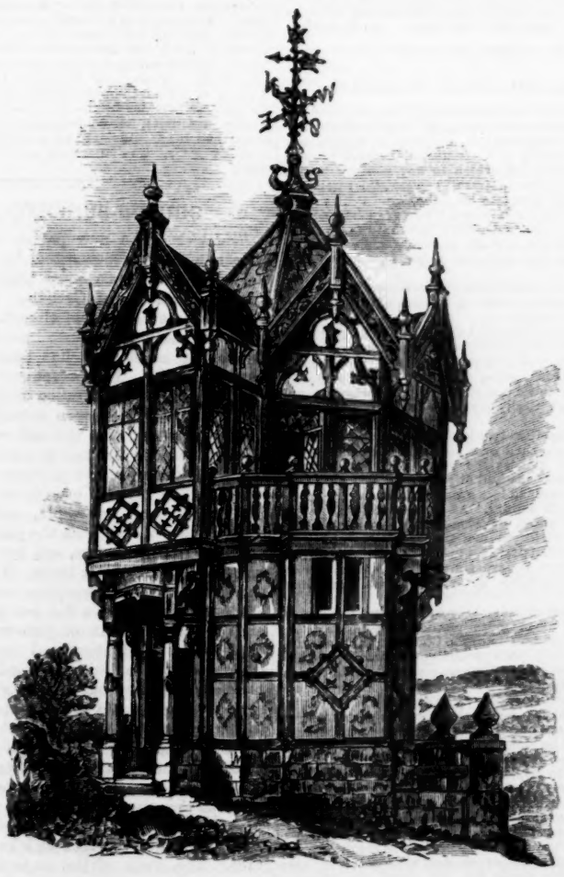
MUNICIPAL BUILDINGS, BELFAST, IRELAND.
Plan.



BELFAST TOWN HALL.—Mr. A. T. Jackson, Architect.

PICTURESQUE ARCHITECTURE.

Design for a Villa in the Old English Wooden Style.



Design for a Bath House and Summer Room. [See p. 277, *ante*.

RAILWAY MATTERS.

A DEPUTATION of tradesmen and other inhabitants of White Horse-street, Ratcliffe, have waited on Mr. Paget to complain of the Great Eastern Railway Company, which had completely blocked up the northern end of the street, a few feet from the Commercial-road. This had continued for upwards of five weeks, to the serious detriment of trade. The street was the great outlet for vans, wagons, carts, and other vehicles from the numerous coal-wharfs and other water-side premises to the northern parts of the metropolis, and all that traffic was stopped. A tradesman said a bridge, which continued the Blackwall line of railway over the street had exhibited symptoms of decay, and the buttresses had given way. What he and his brother tradesmen complained of was, the delay in pushing the works forward. Mr. Paget said he could not interfere until the case was regularly brought before him by the board of works of the district.

The bridge over the Dee, forming part of the viaduct which supports the Chester and Holyhead line of rails, is about to be entirely reconstructed by the London and North-Western Railway Company; the old wooden fabric being replaced by a substantial one of iron. A footpath along one side of the bridge open to the public has been suggested, but the company so far reply that the suggestion comes late, as their plans are completed; but the effort to convince them is not to be given up yet.

Mr. John Swan, of Edinburgh, and Mr. Macpherson, goods manager of the North British railway, have submitted to Mr. Tennent (secretary of the Cattle Transit Committee appointed by the Board of Trade) plans of permanent watering-troughs to be placed at special railway sidings where unlimited supplies of water can be secured. These sidings, which may be specially arranged for out-of-the-way places, will cost comparatively little money, while the alteration required in the trucks, by which a top bar will be temporarily dropped to allow the animals to put their heads into the raised troughs, is of the most trifling character. As animals, unlike human beings, will only drink when they are thirsty, these trough-sidings might be conveniently placed about 200 miles apart.

THE RELATION OF THE STATE TO SCIENCE.

LAST week a conference was held at the rooms of the Society of Arts, to discuss the question of the "Relation of the State to Science, and the Necessity for Official Inquiry into the Subject by Royal Commission." Lord Henry Lennox, M.P., presided, and the following resolution was adopted:—

"That the conference at the Society of Arts desires emphatically to affirm the conclusion of the British Association for the Advancement of Science, that a royal commission to inquire into the relations of the State to science is very desirable, and to recommend that the scope of the inquiry be made as wide as possible."

THE ENCLOSURE OF BRISTOL EXCHANGE QUADRANGLE.

AT a recent special meeting of the town council, the Corn Exchange Committee presented a report and recommended the carrying out of a plan prepared by Mr. E. M. Barry, architect, for covering the quadrangle of the exchange, at a cost of about 4,000*l*. By this plan, according to Mr. Barry's report,—

"The central area is enlarged to 55 ft. by 55 ft., from 50 ft. by 50 ft., as at present, which would add greatly to its convenience and architectural effect. To obtain this advantage, and to avoid the danger of darkening the ground-floor corridors, the latter are somewhat reduced in width by setting back the columns, though still of convenient and handsome dimensions. Galleries are placed on the upper floor, and the whole internal area, including the galleries, is covered with a roof, giving a total height of 57 ft. to the lantern. In order to avoid the objections to a roof of iron and glass over galleries filled with people, this mode of construction is confined to the central area, and the roofs over the galleries are of an architectural character, with a double-glazed skylight in the middle of each bay. In consequence of the doubt before explained of the adequacy of the present columns to support such a construction, they are raised to the upper floor, and their place taken on the ground-floor by new columns, with an appropriate entablature of the Doric order. This order, being of a stronger character than the Corinthian, is better calculated to support the weight of the galleries, and is architecturally suitable for the lower of two orders. The galleries might be level, or fitted with raised seats; in the latter case, they would provide sitting accommoda-

tion for about 800 persons; and the hall, constructed according to this design, would be suitable for many public purposes, such as meetings, concerts, &c."

The Mayor moved, and Alderman Ford seconded, the adoption of the report. Alderman Green moved as an amendment,—

"That to cover the interior of the exchange, and alter it in the way proposed, may impair, perhaps destroy, the beauty of one of the finest public buildings, erected at a large cost by the merchants and traders of Bristol, from the designs of an architect of great skill and taste."

Alderman Robinson seconded the amendment, but after considerable discussion the recommendation of the committee was adopted without a division.

TURNMILL STREET: ARCHES UNDER PUBLIC WAYS.

SIR,—Additional arches, invert arches, front enclosure, and transverse walls are being carried up to the existing arches under the public way in Turnmill-street, by Messrs. Peto & Betts, who repudiate any liabilities under section 9 and 25 of the Metropolitan Building Act, 1855, although called upon by the district surveyor of Clerkenwell to return the proper and necessary notices in respect of such works, and, in defence, refer to the solicitors of the Metropolitan Railway.

What they are doing is in anticipation of further subsidence. The roadway has gone down 2 ft. The Metropolitan Board might perhaps take steps. There is evident on the part of Railway Companies a determination to resist all Common Law. A SURVEYOR.

"FEVER DENS."

SIR,—We have heard lately a great deal about "Fever dens," but it appears to me that the proper method is not taken to ventilate them.

I have had notice (where fever has been in the houses), to have all the sashes made to open at top. The same are not hung at present, and many are not in small and old houses at this present time. This is all very well if you could only persuade the tenants to keep them open, but the poor generally are so averse to fresh air that they frequently paste and paper up the sashes in cold weather.

I would urge that an iron air-brick or ventilator be let into the chimney breast, close to the ceiling, the cutting made upwards at a very sharp angle into the flue: this would carry off the foul air, which is very bad in many cases where eating and sleeping are carried on in the same rooms.

The ventilator should always be kept open. If there were one in every poor person's living and sleeping room, I think we should not have so many cases of fever: they are bred by the foul air breathed over and over again. Care should be taken that the tenants do not paper up the ventilator. J. D.

*** How many hundreds of times has this been said? And yet it is necessary again to say it.

THE LATE HULL THEATRE.

IN the Westminster County Court, last week, before Mr. F. Bailey, Judge, the case of Jennings v. Chatterton was heard. The plaintiff is a plasterer, carrying on business at 40, Charlotte-street, Great Portland-street, and sued Frederick Balsir Chatterton, the present lessee of Drury-lane Theatre, to recover the sum of 27*l.* 8*s.* 5*d.*, for alleged extras in finishing the late Hull Theatre.

Mr. Laxton appeared for the plaintiff; Mr. Cotnam for defendant.

From the evidence of the plaintiff, it appeared that plaintiff had contracted to do the plaster-work at the the theatre for 150*l.*; but upon going down to Hull he found that the building was not the same as had been represented on the plan furnished to him. The items he enumerated as extras were,—having to seek for scaffolding, 17*s.* 10*d.*; raising the architrave and frieze of columns 6 in. and the second floor 2 ft. 2 in. higher than was shown on the plan he agreed to; altering the reveal and top of main entrance-door, placing a key-stone and altering two windows, instead of doors (as in the plan); making niches of two places shown as windows; adding a portico and four Doric columns to the original plan, and carrying down six Doric pilasters lower than on plan. He mentioned these extras to Mr. Smith, who said, "Very well, get them done, and I will see you righted." He cleared the rubbish away at Mr. Chatterton's desire, and repaired a column which had been injured during an election meeting, which he also charged extra. The extras altogether amounted to 33*l.* 7*s.*, but 5*l.* 18*s.* 7*d.* had been admitted.

In cross-examination, plaintiff said that about 30 ft. of cornice work shown in his plan he did not do, in consequence of the portico, but he did other work to compensate.

The defence was, that the contract was taken for 150*l.*, and the only extras which could be admitted were 4*l.* for the Doric columns and 1*l.* 18*s.* 8*d.* which remained after payment of 159*l.* 7*s.*; that although every little thing had been magnified into an extra, not the slightest abatement had been made; and that the work was, in fact, carried out on the give-and-take principle.

Mr. Jephry Robinson, of Hull, who built the theatre, compared plaintiff's plan with the one from which the theatre was erected, and said that they both agreed, and that the theatre was not 2 ft. 2 in. higher than was represented on plaintiff's plan. The bills were paid, and he heard nothing of all these extras until about a year after the job was finished, about the time the theatre was burnt down. Mr. Smith was architect, and was to decide upon any extras and give orders. When the contract was taken, witness pointed out that the two side-doors were turned into niches. Plaintiff had no business to put a key-stone. 5*l.* 18*s.* 8*d.* had been paid into court.

Frederick George Smith said he was borough surveyor at Hull, and was architect of this theatre. The plan, so far as heights were concerned, corresponded with the building. In November, 1868, he received an account of 12*l.* 3*s.* 6*d.* for extras, from which he knocked off 17*s.* 10*d.*, and certified for the balance, 11*l.* 5*s.* 8*d.*, which was paid as a settlement of the account. That was the only account for extras which he had seen until the morning of the trial.

His Honour said the verdict must be for defendant. It seemed clear that Mr. Smith was to decide what plaintiff was entitled to for extras, and plaintiff seemed to have acted upon this, and sent in his claim accordingly, which was settled.

Judgment for defendant, and costs allowed.

LATCH-KEYS WITH SAFETY.

SIR,—The public have been recently cautioned against thieves with skeleton latch-keys, who lately, on a Sunday evening, visited some houses in Bloomsbury. I have devised a plan by which I think such keys might be rendered useless, while the inhabitants would still be able to let themselves into their houses. My suggestion is, that the chain, with which most doors are provided, should be more frequently used to supplement the latch than it is at present, and that two of the links near the end attached to the wall, or door-post, should be separated, and be connected again by means of a good padlock of which the inhabitants of the house might carry a key; or, better still, that one of those padlocks should be used which are opened by being turned round so as to spell a particular word, to unlock which, therefore, no metal key would be of any use. A. T. P.

DANGERS OF KITCHEN BOILERS.

SIR,—I have just read a letter under the above head in your paper. If my experience is worth anything you are welcome to it. My kitchen boiler is supplied by a cold-water cistern in the roof of my house in the country, say about 28 ft. above the boiler, whence a pipe rises to an iron hot-water cistern about 2 ft. below the level of the cold-water cistern. An escape-pipe issues from the hot-water cistern through the roof: this got stopped up by a deposit of lime, the effect of which was that one of the lead pipes burst, and wetted the ceiling of the room below to some extent. There seems to me considerable safety in the lead pipe giving way easily before the pressure had accumulated sufficiently to damage the boiler or cause an explosion. In frosts, I am obliged to prevent the water going down into the boiler by a stop cock, as soon as I find the water is frozen in the pipes, which, however, may often be prevented by hay-bands round the pipes. F. J. M.

THE PROJECTED CHANNEL RAILWAY.

SIR,—In the concluding sentences of your article of last issue upon our scheme for crossing the English Channel by a railway, you observe that "it is, however, unnecessary to enter into the details of a discussion, because there is one simple consideration, which to any prudent man is wholly conclusive on the subject:" you say, "let us admit Mr. Bateman could complete his tube, &c. . . . and that the miners come out into open air on French territory. Still there remains the undeniable fact that the whole of this enormous toil lies, at every moment, and will be, at every moment, at the mercy of a few barrels of gunpowder."

It so happens that there is some experience of torpedoes constructed by Governments on the largest scale and of the most powerful explosives.

It is, perhaps, not generally known that the largest mine ever used by Governments for the protection of harbours, &c., is wholly ineffective in deep water. Deep water is our difficulty in the construction of the Channel railway,—in turn, deep water is its safeguard; for it cannot be approached, and is practically beyond the reach of destructive agents.

The most destructive torpedoes may have injurious effects upon the thin shell of a vessel in a depth of water not exceeding 30 ft., provided the mine should explode within a few yards of the hull of the ship. The charge of such a torpedo, confined in a strong iron casing, must be over one ton of rifle powder. At three times that depth, or about 90 ft. of water, the charge must be twenty-seven times that at 30 ft. to produce similar effects; at 120 ft., it would be sixty-four times that at 30 ft.; and so on. This law was determined by experiment in various countries, and in England notably by Field-Marshal Sir John Burgoyne.

But even such enormous charges, involving the use of scores of tons of the strongest powder, would have a very limited range at the bottom of the Channel. Unless such a charge were placed in close proximity to the tube, at a distance not exceeding a few fathoms, no effect would be produced, for the object to be destroyed must come within the cone of action of the torpedo. The proper ignition of such large masses of explosives is also a most difficult matter. If mismanaged, not one-tenth of the charge will be fired, and the rest will be blown away unconsumed.

It is easy to see why the above law of resistance holds good. In order to displace one cubic yard of water near the mine, precisely the same volume of water must be displaced on the surface within the radius of action. The whole mass of water above the mine, represented by an inverted cone, must be set in motion. The volume of water to be lifted by the mine increases as the third power of the height of the cone or depth of water; consequently, at double, treble, &c., the depth, the weight of water to be set in motion would increase eight, twenty-seven, sixty-four, &c., fold, and the power required, represented by the charge, would be correspondingly eight, twenty-seven, sixty-four, &c., times that at 30 ft. to produce similar effects.

Your "few barrels of gunpowder" would evidently be very ineffective and harmless; but, assuming the proper quantity to possess any element of mischief, may we not ask how you would propose to sink such immense charges from the surface of the Channel to within a few fathoms of the iron tube? Could any mischievous person tell its precise position in the open Channel within 100 yards; or, if he could, could he tell how many yards a gentle current would carry his "barrels" right or left of the tube whilst they were sinking 30 or 40 yards through water? Do not you think that to lodge such a mine would require the ingenuity of the Royal Engineers, plenty of time, and no one to interfere with their grand operations?

It is only in shallow water, within half a mile or so of each shore, within the breakwaters and under easy range of guns, that such an attempt might have a chance of success. And, even assuming for the sake of argument, that a hostile power had, by greater ingenuity than is at present at our command, somehow succeeded in the destruction of the railway, do not you think that England and France—the assumed joint proprietors of that railway—are powerful enough to make the aggressors, or any combination of them, pay for the damage they had done?

J. F. BATEMAN.
J. J. REVY.

AN ARCHITECT'S ACCOUNT WANTING DETAILS.

A SOMEWHAT important case, it being the first of the kind heard under the New Bankruptcy Act, has been decided by the registrar of the Southampton County Court. It seemed that Messrs. Parmenter & Guillaume, of Southampton, architects, were employed by Mr. John Gater, of West End, to superintend the erection of some buildings for him, Mr. Toogood being the builder. On the account, amounting to 57*l.* 14*s.*, being rendered, Mr. Gater disputed it, one of the grounds being that the last builder's certificate should not have been given, and ultimately Messrs. Guillaume & Parmenter issued a trader's debtor summons under the Bankruptcy Act, 1869.

Mr. F. Leigh appeared to show cause against the rule, contending that the proceedings were taken to annoy, and the particulars furnished were insufficient, and that there was consequently no foundation for the court's jurisdiction. The particulars delivered should be of such a character as to show the debtor what the claim was for, and whether it was a *bonâ fide* claim above 50*l.*

Mr. Killby, who supported the summons, said Mr. Gater knew perfectly well to what the account referred, he having had full detailed particulars.

The Registrar considered he had nothing to do with any particulars which had been furnished before, but only those annexed to the summons. He should take no evidence. Under the Act Messrs. Parmenter & Guillaume were bound in the particulars to give reasonable and convenient certainty as to dates and all other matters. On reading the particulars he saw they set forth services rendered, materials found, commission, and account "stated;" while the affidavit of the debtor said he did not owe the sum of money upon which it was sought to make him a bankrupt; in fact, he said he did not owe Messrs. Parmenter & Guillaume 50*l.* There was no date of the "account stated," no amount named for the services or materials, but they were all looped together in one sum, and he did not, therefore, consider the particulars of demand were of "expressly reasonable and convenient certainty as to dates," and therefore he should rule that they were insufficient. Reading the clause of the Act of Parliament, which provided that the property of a debtor might be equally divided amongst his creditors, and looking at the affidavit filed by the plaintiffs, and at that filed by the defendant, he did not think these proceedings were taken for the purpose intended by the Act, the debt being so completely in dispute. Even supposing the particulars annexed had been sufficient, he certainly should not have made an order. The summons must be dismissed, with costs.

CHURCH-BUILDING NEWS.

Bridekirk.—The new parish church at Bridekirk has been consecrated by the Bishop of Carlisle. The plans were prepared by Messrs. Cory & Ferguson, of Carlisle. The site is one closely adjoining the old church. The principal details of the old structure have been preserved. The old chancel arch has been re-used in the organ-chamber. The present south doorway was the original south entrance of the church. The north doorway has been rebuilt in the present south transept; and the old vestry door now gives access to the belfry stairs. The general features of the edifice partake of Norman character. The plan is cruciform, with a chancel, north and south transepts, and a nave. The square tower rising from the junction of the four parts is groined below, and has a large bell-loft filled by a peal of six bells. The upper part of the tower has eight windows—two on each side, and is terminated by a flat parapet. The church and tower are built of yellow freestone from quarries at Tallentire and Aspatria; and the interior of the building is lined with brick supplied by Mr. Lucock, of Broughton Moor. The original plan of the architects was to show the tower roof, to add to the length of the nave, and to construct the inside walls and arches of dressed stone. But they had to substitute brick for the internal lining, and to trust for effect more to the massiveness of the parts than to the elaboration of details. The chancel, like the tower, has been groined with brick, having stone ribs. The roofs of the nave and transepts are semicircular, and lined with oak boarding. There are stained memorial windows at the eastern and western ends, and in the south transept of

the church. The seats in the nave and transepts are open, and made of pitch pine. The seats in the chancel, built at the expense of the lay rectors, are of oak. The reredos is of red terra cotta, executed by Messrs. Blashfield, of Stamford, from a design of Messrs. Cory & Ferguson. The communion railing was carved by Mr. Pickering, of Carlisle, by whom also the foliage and decorations of the capitals and the corbels supporting the groinings were wrought. The organ, which was built by Messrs. Holt, of Edinburgh, and cost 200 guineas, is placed near the pulpit in the north transept. The church is warmed by hot-water pipes of peculiar construction, whereby the surface of the pipes forms the floor, and much less heat is lost than when the pipes are laid in a trench with a grating above. The masonry of the church is the work of Mr. Henry Graves, of Aspatria, builder; the joiners' work has been done by Mr. Henry Dent, of Cockermouth; the plumbing, by Messrs. Thomson & Sons, of Carlisle; the painting, by Messrs. Slee & Morgan, of Carlisle; and the heating apparatus was supplied by Mr. Clarke, of the same place. The cost of the church, which is capable of seating 300 persons, has been about 4,500*l*.

Webheath.—A new church, dedicated to St. Philip, at Webheath, in the parish of Sardebigge, Worcestershire, has been consecrated. The edifice, which has been erected through the liberality of the late Baroness Windsor, is from the designs of Mr. Preedy, of London, architect, and is in the Early Decorated style of Gothic. The ground plan comprises a nave 60 ft. long by 22 ft. wide; chancel, 28 ft. long by 18 ft. wide; a vestry on the north side, and porch on the south-west. The accommodation is for 200 adults and children. There is a stone bell gablet over the chancel arch. A suitable dwarf wall and an iron railing with entrance-gates encloses the site on three sides. The materials used are the local stone from the Hewell quarries, with Bath stone-dressings, bands of Red Finstal stone being introduced on the exterior, as also on the interior facing, which is of stone throughout. The roofs, which are open-timbered, are of red deal and pitch pine, boarded and covered with Staffordshire tiles. The font is of Painswick stone, with polished shafts of Irish green marble, and has an open oak cover. The pulpit and stairs on the north side of the nave are of English oak, with carved panels. The prayer-desk, chancel seats, altar table and rails, are of the same material, and the benches in the nave of stained deal. The windows are glazed with plain cathedral glass, of two tints of green, with the exception of the east window, which is filled with stained glass designed and executed by the architect, and contains the following subjects:—The centre light the Crucifixion, having on either side types of the same, namely, setting up of the Brazen Serpent, and Abraham offering up Isaac. In the tracery over the centre light is Our Lord in Session in His Mediatorial Office, with angels in the side tracery. The passage spaces in the nave and chancel, and the porch floor, are laid with Godwin's tiles. The church is heated on the hot-water system by Mr. Skinner, of Bristol. The carving is the work of Mr. Boulton, of Cheltenham. Messrs. McCann & Everal were the contractors; and Mr. Smith, the clerk of works. A reredos, constructed for the most part of Carthaginian porphyrites brought from Rome by the late Lord Plymouth, is in course of execution by Messrs. Burke, of London. The design consists of the material arranged in bands and patterns. There is a central cross in white marble flanked on either side by panels containing angels bearing musical instruments, executed in glass mosaics on gold backgrounds. In the side compartments are the Alpha and Omega, and the sacred monograms, incised in coloured cements on white alabaster.

Colbury (New Forest).—A new church at Colbury has been consecrated. Mr. and Miss Ibbotson called in Mr. Ferrey as architect. The edifice has cost between 2,000*l*. and 3,000*l*. It is in the Decorated style of architecture, and consists of a nave and chancel, with a vestry and north porch. Over the western entrance is a bell turret, about 60 ft. high, the frame being of oak, with ornamental cuspings in the upper part, and the covering cleft oak shingle. The walls are of brick and field flints, the quoins and dressings, both within and without, being of Corsham stone. The nave has an open-timbered roof, filled in at the back of the rafters with V-jointed boarding. The roof of the chancel is polygonal, with moulded ribs. The outer covering is of local red tile, with banded courses. The internal walls up to the window cills are lined with Maw's tiles, supplied by Messrs. Simpson & Sons, of London. The encaustic tile pavement of the sanctuary is also of Maw's manufacture, and so is the reredos, though here mosaic has been introduced for the various sacred symbols and emblems. The pulpit, at the south of the chancel arch, is of stone, having panels filled in with mosaics. Near the northern porch is a stone font, the upper portion, bearing the typical flowers of the style in which the church is built, being supported by a series of arches, the pillars of which are of coloured stone. The east window has been filled with stained glass as a memorial of the late Mrs. Ibbotson. The three principal lights contain the Resurrection, the raising of Lazarus, and the raising of Jairus's daughter, the geometrical portions of the head of the window being filled with a suitable design. Accommodation is provided for about 200 persons, the seating being stained deal benches, and nearly the whole cost has been met by Mr. and Miss Ibbotson. The builders were Messrs. Goddard & Son, of Farnham, who have also nearly completed the parsonage-house. Mr. Charles Stapleton was clerk of the works. The grounds have been laid out by Messrs. Horsman & Sons, nurserymen, Longdown.

Barcheston.—The ancient church here having fallen into decay, has just been restored from the designs of Mr. Ewan Christian, of London. In removing the old plaster, at the east end of the north aisle, was discovered on old Norman door, blocked up; this has been retained. The church was closed on Quinquagesima Sunday, 1869, and the work begun by Mr. A. Groves, of Milton, near Chipping-Norton, whose contract was accepted.

Romaldkirk.—The church restoration being nearly completed, service has been resumed in the edifice. The works have been carried out, from the plans of Mr. Haswell, architect, North Shields. By means of outside drainage, the damp which formerly affected the walls has been dispelled; and the removal of the gallery has made the church lighter, as well as done away with a structure that deformed the interior of the building. The large west window, formerly obscured by the gallery, is now revealed in its integrity. The high-backed pews remain.

Montacute.—The ancient little church at Montacute, near Yeovil, which has for a long time past been badly out of repair, is to be thoroughly restored and renovated. It is the parish church, and is dedicated to St. Katherine. The recent examination has discovered in it relics of Norman architecture. The plan for the work of restoration was prepared by Mr. Hall, architect, London, who directed the pulling down and rebuilding (in the local "Ham stone") of the nave and transepts, the substitution of new open benches for the antiquated high pews, &c. The tower will remain as it is, but the rebuilding of the other portions of the edifice is absolutely necessary. The plan also provides for the reparation and bringing in view of an old window at the western end of the church, which has hitherto been partially blocked up and obscured by the ringing-loft. The transepts belong to the Phelips family, of Montacute House, who will accordingly bear the expense of the restoration to that extent. Tenders for carrying out the work were invited, and the contract has been entered into. The contractor is Mr. James Pudden, of West Coker, the amount of whose tender was 947*l*. There were eight other tenders, the highest of which was 700*l*. above the one accepted. The greater part of the money required has been subscribed.

Runhall (Norfolk). — The church of this parish has been re-opened after having undergone a repair and partial restoration. It has of late years presented an appearance of desolation;—its chancel destroyed and gone; its window tracery patched with wood and red brick; its modern porch unsightly and dilapidated; its walls thrust out of the perpendicular; its east gable cracked by the pressure of an ill-constructed roof, erected some seventy years ago, which has of late been liable at any time to fall in from decay; and its tower, with its floors gone, and its sounding windows in ruin. The repair and partial restoration which have been effected are due to the very liberal response which has been made in the neighbourhood to the appeal of the vicar, the Rev. B. B. Slipper. The Rev. J. Barham Johnson, rector of Welborne, has given attention and trouble to the work while in progress. The architect has expended the very limited funds which were available for the restoration in an economical manner. The form of the original roof could be gathered from a curved brace and the impression of a putline, and it would have been most desirable to restore it, thus repeating the local type of broad-naved churches found at Elsing, North Tuddenham, and elsewhere; but to do so would have involved pulling down and reconstructing the north wall, with its doorway and windows: therefore the buttresses have been rebuilt in cement, the walls have been repaired, and the simplest possible roof, supported by posts from the ground, and stiffened by longitudinal and transverse curved braces, has been made to relieve the side walls from pressure, and to give to the square-looking room of late years the appearance of a church, with nave and side aisles, a treatment which is found in the ancient church of Winterton, in this county. The restoration of the chancel being found impracticable, a raised daïs, paved with tiles, for the holy table, with singers' seats on either side, has been placed at the east end. The remaining space has been provided with open benches of deal, and the tower has been made available for a vestry. The porch, the stone and glass of the windows, and the tower sounding windows, have been patched up as much as the funds would admit of. The contract was carried out by Mr. Hubbard, of East Dereham. The architect was Mr. Edward J. Tarver, of London. During the progress of the work, crocketed fragments of the ogee-headed niche in the east wall and other remains were discovered.

SCHOOL-BUILDING NEWS.

Tamworth.—A new day-school, which will accommodate more than 300 children, has just been erected by the Roman Catholics of this town. Mr. C. Clarson was the builder, the cost being 400*l*.

Southampton.—New Roman Catholic Schools have been opened in Bugle-street. Mr. R. Critchlow was the architect. The cost is about 750*l*. There are two rooms, the one on the ground-floor, 35 ft. by 20 ft., and the other upstairs, 40 ft. by 20 ft.: each is 15 ft. in height, with a class-room in the rear, 18 ft. by 12 ft. The upper room is lighted by five, and the lower by four two-light windows, which extend to within 12 in. of the ceiling, the better to assist in the ventilation, which is aided by a series of Boyle's ventilators (recommended for excluding downward draught), fixed in the outer walls. The style is after the domestic architecture of the sixteenth century, adapted to harmonise with several of the old buildings for which St. Michael's-square is noted. The front is entirely of brick, the roof line being broken by three gablets with ornamental verge boards. Mr. Laver is the builder.

Lincoln.—Four memorial stones of the new Sunday schools in Clasket-gate have been laid. These schools, when completed, will be the largest in the city. The main building comprises two rooms, 70 ft. by 34 ft., affording accommodation for upwards of 850 children, reckoning 6 superficial feet per child. Attached are four class-rooms or retiring-rooms, raising the accommodation to nearly 1,000 children. By glass sliding doors it is proposed to separate part of both rooms off to form retiring-rooms for classes on the Sunday; when the rooms are used for public meetings the doors will be thrown back, and the whole space will form one room. The estimated expense, including lighting and fitting, &c., is upwards of 1,200*l*. The character of the building is to be plain and substantial, to correspond with the adjoining chapel.

St. Silas, Islington.—The new schools, which have been erected in Vittoria-place, Barnsbury-road, have been formally opened. They have been built in accordance with the regulations of the Council on Education, and receive the maximum Government grant of 417*l*., and a grant of 250*l*. from the National Society, independent of great assistance from the Bishop of London's Fund. The building, which is in three stories, is intended to accommodate a total number of 417 children; the lower story, comprising a room of 54 ft. by 18 ft., and a class-room, is appropriated to the infant school; the middle story, containing the same accommodation, to the boys; and the upper floor, consisting of a room 43 ft. by 18 ft., and a class-room, is devoted to the girls. There are separate entrances, and two playgrounds. Messrs. Dove, Brothers, were the builders; Mr.

Edwin Clare was the architect. The amount of the contract for the works, inclusive of walls to the playgrounds, was 1,843*l.*, and the actual expenditure was kept within this limit.

STAINED GLASS.

St. James's, Marylebone.—This church is in course of restoration, and the Rev. Sir Lionel Darell, bart., of Fretherne Court, Gloucestershire, has commissioned Mr. George Rogers to execute six stained windows, containing life-size figures of St. James, St. John the Divine, St. Peter, the Virgin Mary, Moses, and Elias. These windows are intended to be dedicated by Sir Lionel Darell to the memory of his late sister, Emily Mary, wife of the Rev. A. B. Lechmere, of Hanley Castle, and other branches of his family.

Ringwood Church.—Two windows, executed by Messrs. Ward & Hughes, of London, are being placed in the lancet lights of the chancel, to the memory of the late vicar, the Rev. R. Holmes Tuck. The subjects are full-sized figures of St. Peter and St. Paul, the patron saints of the church. In a small panel over the figure of St. Peter is a design illustrating the walking on the water, while the group in the corresponding window illustrates the conversion of St. Paul. The cost of these windows has been defrayed by local subscriptions.

St. Patrick's, Brighton.—This church, in Cambridge-road, has just received an addition in the shape of a stained-glass window, presented by members of the congregation to the incumbent, the Rev. J. O'Brien, D.D., and Mrs. O'Brien. The design is of two-fold character, the lower portions of the five principal lights representing Christ in his humiliation, and the upper portions, Christ in glory. The lower part presents a connected scene of the Nativity; Virgin and Child in the manger of Bethlehem, occupying the centre, with the star of Bethlehem above; on one side are the shepherds in attitudes of adoration, and on the other the Magi presenting their gifts. Above, the centre is occupied by a representation of Our Lord enthroned, surrounded by the aureole, and carrying the sphere surmounted by a cross. On the right hand of the throne appear St. Peter, carrying the keys, and St. John the Baptist, with "raiment of camel's hair;" on the left are St. Paul, bearing "the sword of the spirit," and St. Patrick with the type of evil, the serpent, beneath his feet. The tracery of the upper part is filled in with angels (two of them playing musical instruments), the emblem of the lamb and flag, and chromatic devices. The figures are life-size.

Emneth Church. — A stained-glass window, the work of Mr. Wailes, has just been placed in the western end of the tower of this church, in memory of the late Mr. Stimson, for many years a resident in the parish. The window is Perpendicular in style, 18 ft. high and 12 ft. wide. It is divided into four bays by the vertical shafts, and in each bay is depicted a group of figures illustrative of the early life of our Lord. 1. The Nativity, with the Shepherds adoring the Infant Saviour; 2. The Magi presenting their Offerings; 3. The Presentation of our Lord in the Temple; 4. Our Lord surrounded by the Jewish Doctors. Emneth Church has a triple lancet window at the east end, representing the closing scenes in the life of our Lord, also the work of Mr. Wailes.

Pershore Abbey Church.—This church has received a further adornment by the insertion of two large stained windows in the south aisle, as a memorial of the late Mr. Edwin Ball. They are the work of Messrs. John Hardman & Co., of Birmingham. The series of subjects chosen illustrate the chief events in the history of the abbey from its foundation. In the first window are—1. Egilwada bringeth the Saint to Pershore; 2. Abbot Foldbirth cometh to Life; 3. St. Eadburgh serveth her Fellows; 4. Ethelred and Elfleda, Benefactors; 5. Beornoth receiveth a Charter from Ceonulf; 6. The Benedictine Rule brought in; 7. St. Eadburgh chooseth the Religious Life; 8. King Edgar giveth Charter; 9. Earl Odda becometh a Monk; 10. King Ethelred giveth Pershore to Oswald; 11. The Danish Fury; 12. Alphere (Alderman), plundereth the Abbey; 13. The Saint worketh Miracles; 14. Sweyn is defeated. The upper part of the window is filled with figures of King Canute, King Edward I., King Henry III., Bishop Brithray, and Urso D'Abbitôt. The second window also contains fourteen subjects, namely,—1. Abbat Upton is drowned; 2. Abbat Elernis preacheth Crusade to Llewellyn; 3. William de Beauchamp, Benefactor, dies; 4. King Charles breaketh down the Bridge; 5. Harley is made Knight in Jerusalem; 6. Fire breaketh out on St. Urban's Day; 7. King Edward visiteth Pershore; 8. Queen Elizabeth passeth by; 9. The Confessor giveth Lands to Westminster; 10. Abbat Guido is deprived for Simony; 11. Fire burneth Church and Charles; 12. Monastery is dissolved; 13. The Fair holden in the Churchyard; 14. The Church of Holy Cross restored. This subject contains full-length portraits of the Bishop of Worcester, the Dean of Westminster, the late Dr. Williamson, and Mr. Ball. The upper lights of the window contain figures of King Edward III., King Henry V., King Henry VI., and Queen Victoria, as also of Nicholas, bishop of Dunkeld, and Bishop de Politon.

St. Mark's, Woodhouse, Leeds.—The Rev. S. Kettlewell, vicar of Woodhouse, has recently erected a stained-glass window in St. Mark's Church, Woodhouse, to the memory of Ann Elizabeth, his wife. The style of the window is Perpendicular, and it comprises three lights and tracery, the former of which are occupied by the subject of the Sermon on the Mount, extending over the three openings, and inclosed within canopies and ornamentation of suitable design. The tracery and portions of the canopies contain the Beatitudes, with appropriate inscriptions. The glass was from the works of Messrs. R. B. Edmundson & Son, of Manchester.

Books Received.

The Rural Life of Shakspeare, as illustrated by his Works. By C. ROACH SMITH. London: J. Russell Smith, Soho-square. 1870.

THE vast amount of general and special knowledge reflected by Shakspeare's works includes evidence which might be presented, and indeed which has, to some extent, already been presented, to favour the supposition of his having studied for many professions or trades. "The Tempest" would tend to prove him a sailor; "Hamlet," and other plays, a lawyer and mad-doctor; and so forth; but, however that may be, Mr. Smith, we think, has clearly shown Shakspeare's intimate knowledge of gardening and rural life. The force of the numerous allusions to such subjects consists in their vivid and life-like character, as well as in their endless recurrence, and the obvious familiarity with rural modes of thinking, which manifests itself in wit and play upon words, and in conclusions not likely to present themselves to mere users of rural verbiage.

Thus, for example, to the unfamiliar beholder of a splendid display of bloom in early spring, the first and leading idea is naturally that it promises a fine crop; but that is far from being the notion of an experienced gardener, which Shakspeare often reflects in his writings, as in King Henry IV., part ii., act 1, scene 2,—

> —— "As in early spring
> We see the appearing buds, which to prove fruit
> Hope gives not so much warrant as despair
> That frosts will bite them."

And this familiarity with gardening appears in his witty play upon words in use among horticulturists, such as Mr. Smith instances from "As You Like It," about grafting. In act 3, scene 2, *Touchstone* says, "Truly the tree yields bad fruit;" and *Rosalind* replies, "I'll graft it with you,—a medlar; then it will be the earliest fruit in the country, for you'll be rotten ere you be half ripe; and that's the right virtue of the medlar." The drift of this some of Shakspeare's best commentators have failed to see; and Stevens, not understanding horticulture himself probably, says as to it, "Shakespeare seems to have had little knowledge of gardening;" adding, the medlar is a late fruit, not an early! This, remarks Mr. Smith, Shakspeare knew well; and in this very peculiarity lie the wit and propriety of *Rosalind's* retort. To *Touchstone's* remark about the tree bearing bad fruit, *Rosalind's* reply may be thus interpreted:—"I'll graft it with *you*,—a meddling fellow,—a medlar; and, as you are already much decayed, you will change the character of the fruit by hastening its ripening before it is rotten, as all such decayed medlars tend to do; thus making this the earliest instead of the latest fruit."

The same play furnishes a passage equally misunderstood. *Rosalind* says she found the love-sonnet to her on a palm tree; on which Chalmers remarks, "A palm tree in the forest of Arden is as much out of place as the lioness in a subsequent scene." Now *palm* is another name for *willow*, and willow was the tree, therefore, on which the sonnet was *appropriately* fixed.

Mr. Smith has clearly made out his case, by help of the numerous quotations which he has gleaned from Shakspeare's works, in his interesting and curious little treatise.

Recollections of Eton. By an ETONIAN. With Illustrations by SIDNEY P. HALL. London: Chapman & Hall. 1870.

IT would not be difficult to find fault with this volume; to ask if Eton masters had taught the writer to say,—"With that he produced a couple of half-sovereigns, which neither of them *were* slow to accept," or "I paid him out for it, however, if it *was him*" (p. 196); and to point out that it is not the *grub* of the silk-worm that eats the lettuceleaves (p. 90), and so forth; but we have no desire to take that line. The book describes as a boy would describe life at Eton,—its sports and pastimes rather than its intellectual struggles,—and will give pleasure to many other boys.

Elementary Principles of Carpentry: a Treatise on the Pressure and Equilibrium of Timber Framing, the Construction of Floors, Roofs, &c. By THOS. TREDGOLD, C.E. Fifth Edition. London: Lockwood & Co. 1870.

To the third edition of Tredgold's well-known work, Mr. Peter Barlow added an appendix of considerable value, containing plates of roofs. The new edition, the issue of which we have now to announce, contains this with a full examination of the roof and vaulting of King's College Chapel, Cambridge. Some of Tredgold's tables are a little under the mark; nevertheless the volume ought to be in every architect's and every builder's library, and those who do not already possess the third edition, ought to avail themselves of the new issue by Messrs. Lockwood & Co.

Miscellanea.

The Historical Manuscripts Commission.—The first report of the Historical MSS. Commission has been published. The Commissioners say their object has been fully appreciated and favourably received. Many collections, the existence of which was unknown, have been brought to light and submitted to their inspection. They say that had the funds placed at their disposal for the appointment of inspectors been less limited, larger results would undoubtedly have been produced. Very important and valuable materials have already been brought to light, illustrating some of the least known periods of the history of Great Britain from the Saxon era down to the seventeenth century. The Commissioners hope that with enlarged powers of compiling and publishing calendars of the more important papers that may be brought before them, they will be able to render a most essential service to the historical student, not only in this country, but throughout the civilised world. In the Appendix (which consists of 133 pages) there are set out, as specimens of the results of the Commissioners' work, numerous documents of great historical interest. As a single instance out of many, we may state that in the collection at Montacute House, in Somerset, amongst a bundle titled "Law Papers," a collection of original documents relating to the Gunpowder Plot was found, of which the proprietor himself knew nothing, and probably the bundle had never been untied since the year 1612.

St. Mary Magdalene, Taunton. — The following notice has been freely circulated throughout the parish: — "The plan adopted by the parish in vestry provides free and open access, by steps, into the chancel, on the north and south from the cross-aisles, and on the west from the nave. The faculty requires strict adherence to the plan. The north and south entrances have been entirely closed, and that on the west obstructed by a wall and gates for its whole width. A few parishioners have commenced in the Consistorial Court, at Wells, to recover to the parishioners their right of unobstructed access to the chancel by these three approaches, in accordance with the plan and faculty and the vote of vestry thus illegally infringed, and appeal to their fellow parishioners for co-operation and support. Protestant principles as well as legal rights are clearly involved."

Artists' Benevolent Fund.—The sixty-first anniversary festival of this institution was celebrated by a dinner at the Freemasons' Tavern on Saturday, the 2nd inst. Viscount Enfield, M.P., presided, and in giving the toast of the evening, said the fund was established in 1810, and received from George IV., its patron, a royal charter on the 2nd of August, 1827. The Queen was now the patron of the institution, which consisted of two separate and distinct branches—the Artists' Annuity Fund and the Artists' Benevolent Fund. The Artists' Annuity Fund was raised and wholly supported by the contributions of its members for their own relief in sickness or superannuation. Three hundred artists were at present members of the annuity fund, and all artists of merit in painting, sculpture, architecture, and engraving were eligible to become members. The Artists' Benevolent Fund, for the relief of the widows and orphans of members of the annuity fund, was supported by the donations and subscriptions of the patrons of the fine arts, by artists, and by the annual contributions of the members of the annuity fund. Since the formation of the fund 30,812*l.* had been distributed in relieving widows and orphans of British artists. The toast of "The Chairman," proposed by Mr. S. Solly, and "The Royal Academy," given by the Chairman, and acknowledged by Mr. Lumb Stocks, followed. Mr. Godwin, in proposing "The Societies connected with the Fine Arts," expressed his opinion that in England young artists had not the same opportunities of obtaining the technical and manipulative knowledge of the painter's art as men had in France, where they were admitted to the studios of painters of eminence, and saw them at work. The result was that on the Continent an artist began his career where in England he too frequently left off. He should be glad to see our English artists opening their studios to young students more freely. Among the other toasts were, "The President and Members of the Artists' Annuity Fund," proposed by Captain Dighton; and "The Artists' General Benevolent Institution," given by Mr. C. J. Dimond. Mr. Lambton Young, the secretary, read a list of subscriptions, amounting to upwards of 450*l.*

New Episcopal Chapel at Culross, Scotland.—A new Episcopal chapel is now being built, at the sole cost of Mrs. Sharpe Erskine, of Dunimarle Castle, on a fine terrace in her grounds. This edifice, which is intended to bear the name of St. Serf, has been designed by Mr. R. Anderson, of Edinburgh, architect. The style adopted is Transition (end of the twelfth century), being the style exemplified in the earliest remaining parts of Culross Abbey. The building is intended to serve as a mortuary chapel for the foundress, as well as a place of worship for the Episcopalian families of the neighbourhood. It is of oblong shape, measuring internally 66 ft. by 18 ft. The east end is apsidal, and the west gable is surmounted by a belfry, having two tiers of openings for a peal of three bells. This gable is buttressed, and has a large circular window filled with tracery. The entrance to the chapel is on the south side, near the west end. The apse is lighted by five single-light windows, the semicircle internally being arcaded. The chancel has a two-light window on the south, and an archway on the north side for the organ. From the organ recess access is given to a small vestry. The nave is lighted by five single-light windows on each side. The whole of the chapel is vaulted internally with wood. The church will be fitted up in the usual manner for the clergy and choir, and the nave will be furnished with open deal benches for a congregation of about eighty.

Competition at Prescot.—The local board of this place have recently decided upon competition schemes for the sewerage and improved water supply of the district. The first premium of 100*l.* has been awarded to plans by Mr. Brierley, civil engineer, Blackburn, who has been retained to carry out the works. The second premium of 35*l.* has been awarded to Mr. W. A. Richardson, of Tranmere.

Passing the Glass with a Vengeance.—The other morning, at a draper's in Liverpool, a gentleman, instead of going out by the doorway, inadvertently stepped into one of the windows, which was empty at the time for the purpose of being redressed, and before any of the astonished salesmen could interfere had made his way into the street, through a very large thick plate-glass window. Fortunately, the only injury he received was a cut on the left cheek.

The Objectionable Sculptures on the Facade of the Paris Grand Opera House. M. Carpeaux assigned to a photographer, named Appert, the exclusive right, which he assumed to be still in his possession, of making photographic copies of his group of dancing girls. Another photographer, named Randnitz, conceiving that all the world has a right to photograph public buildings and their appurtenances, fixed his apparatus in the public street, brought it to bear upon M. Carpeaux's statues, which are popular, and placed in the shop windows a representation of the sculpture. M. Carpeaux and his assignee, M. Appert, brought an action against M. Randnitz for infringement of copyright. The Court of First Instance of the Seine rules, however, that the sale by M. Carpeaux to the Emperor's Minister, without making any reservation of the right to photograph his statues, was an absolute alienation and a bar to his action. MM. Carpeaux and Appert were, therefore, sentenced to pay 3,000 francs damages to M. Randnitz for seizing his photographs, and to defray all the costs of the litigation.

Masters and Men: Non-liability for Accidents.—A case of importance to workmen and their employers was tried at the Liverpool assizes on Tuesday last. A painter in the employ of a local firm was sent to work upon a scaffold which had been erected by other men in the same employ, and the structure giving way, the poor fellow was so seriously injured as to be permanently debarred from following his avocation. He now brought an action against his employers to obtain compensation. Mr. Justice Willes ruled that the action could not be maintained, for it had been decided over and over again that a master would not be liable for an accident happening to one of his workmen, through scaffolding erected by other of his workmen, unless some misconduct on his part were proved. It had been the law for the last thirty-three years that a servant could not bring an action against his master for the negligence of any other servant in the common employ. The plaintiff was accordingly non-suited.

Bilston.—At a special meeting of the Town Commissioners, after going through the modified plans for the enlargement of the baths, the Board accepted the following tenders:—Messrs. Thompson & Sons, for lengthening the boiler, and for a new tank, 21*l.* 10*s.*; Messrs. Claridge & North, for the engineer's work and new baths, 120*l*; Mr. S. Sansome, for the general builder's work for enlarging the swimming-bath, 180*l.*; and Messrs. Garratt & Holmes, for painting, 69*l.* Total, 390*l.* 10*s.*—At a recent meeting of local ratepayers it was resolved, by a large majority, to adopt the Free Libraries Acts.

Design in Berlin.—It has been determined to form an exhibition in Berlin between the 10th and 24th of the present month of April, with the object of generalising and elevating the study of drawing, in giving teachers and the public the opportunity of judging of results obtained, and of the efforts that are being made towards their improvement. The exhibition is to be divided into three groups; the first to consist of models and examples; the second of works of all kinds produced by pupils; the third, of instruments and materials of all kinds connected with drawing.

University of London.—The new building of the University of London, in Burlington-gardens, illustrated in our pages, will be opened by the Queen in person on Wednesday, May 11. Her Majesty will be accompanied by the Prince and Princess of Wales and the Princess Louise. We may venture to say it will be satisfactory to the profession should it be found that her Majesty intends to confer honour on the architect of this building, the merit of which is undeniable. Mr. Pennethorne is a public servant of long standing.

The Round Church at Northampton.—An appeal is being made to the public for additional funds for the completion of the restoration and enlargement of St. Sepulchre's Church, or rather for the restoration of the old round church as a vestibule to the new. For this 1,800*l.* in all are requisite, and of that sum 1,400*l.* have been subscribed. The round church is in a sad state, and cannot long be allowed to remain as it is.

The Taunton Surveyorship.—Mr. Hargreaves, surveyor, has sent in his resignation to the Taunton Board of Health, and it has been accepted.

City Market Accommodation.—At a special meeting of the Common Council last week, a motion was propounded by Mr. Rudkin for disestablishing Billingsgate and Leadenhall markets, and erecting in their stead a large fish and poultry market on ground belonging to the Corporation of London in the immediate neighbourhood of Smithfield. Mr. Fricker moved an amendment that it was desirable that the fish-market at Billingsgate and the poultry-market in Leadenhall should be enlarged and improved, and that the Markets Committee be instructed to obtain plans with estimates of the cost of such improvement, and submit them to the Court forthwith. Eventually, the amendment of Mr. Fricker was carried by a considerable majority.

The Exhibition Model of Lincoln Cathedral.—The *Gentleman's Magazine* devotes a rather lengthy paper to a description of "A Wonderful Building," — that is, the model of Lincoln Cathedral made by a poor farm-labourer out of old bottle-corks, and which was exhibited at the International Exhibition of 1862. It took ten years, we are told, to build up this cathedral of corks, cut and filed to look like stone; and a million corks were consumed in the erection. It produced 800*l.* at the Exhibition, and has gained its inventor a yearly income ever since. "Altogether he calculated that he had reaped 3,000*l.* from the structure. For a small portion, even like the southern porch, with its cork angels and cork devils going to 'eaven and 'ell respectively, he had been offered 15*l.*; and for a single pinnacle, 2*l.*"

The New Corn Exchange, Cambridge.—This question is again postponed. Counsel's opinion as to the legality of purchasing property for the purpose of building a Corn Exchange is that the corporation had no power, under the several Municipal Acts, to do so. The market committee, therefore, after a good deal of discussion, have resolved that proceedings should be stayed, and that a further opinion of counsel should be taken on the subject. The local *Chronicle* states that advertisements for tenders for the new Corn Exchange had been sent for insertion in the local papers, and that Mr. A. D. Claydon had been instructed to sell the materials of the buildings now on the site.

The Northern Architectural Students' Society.—On Saturday, the 2nd, this society held its first out-door meeting at Seaton Delaval Hall. The members present inspected the interior as well as the exterior of this fine building. The hall was erected during the earlier portion of the eighteenth century, from the designs of Sir John Vanbrugh, architect. It was greatly injured by fire in the year 1822, and has not been restored. Fortunately, the destruction is mostly confined to the interior, so that the exterior is left almost intact. The Anglo-Norman church in the grounds was also visited.

Birds and the Fashion.—According to M. Pouchet, the architecture of birds has changed with that of men. In former days, when the swallow's nest was built against Gothic edifices, it made a semi-globular nest with a very small rounded entrance, but in the new streets of Rouen its nests are now found to be of a semi-ovoid instead of semi-globular shape, and the entrance is a long transverse cleft.

Worcester Cathedral.—The Dean and Chapter have contracted with Messrs. Collins & Cullis, of Tewkesbury, to pave the floor of the Lady Chapel and its two aisles, and also those of the north-eastern and south-eastern transepts and their aisles, with red and yellow Mansfield stone, white Portugal stone, and black marble, from designs of the thirteenth century, prepared by Mr. A. E. Perkins, the resident architect.

Worse and Worse.—The following tenders were sent in for alterations at 51, St. Martin's-lane, for Messrs. Hayward & Co. Mr. W. F. Potter, architect:—

Stokes & Gill	£429
Watson, Brothers	320
Perkins	295
Hammer	239
Honour (accepted)	153

Lectures on Health.—The Social Science Association have made arrangements with Dr. Guy, F.R.S., for the delivery of four lectures on "Health and Disease" in their economic relations. The first will be given on Tuesday evening, April 12th, at 8 p.m., in the room of the Society of Arts.

Sea Baths in London.—Negotiations are said to be going on to enable certain persons interested in bringing salt water to London for the purpose of providing sea baths, to carry out their object by means of the London, Chatham, and Dover Railway. The water is to be brought up from Herne Bay in tanks; and at so small a charge that a sea bath may be brought within the reach of any person of moderate means.

Industrial Art in America.—A plan is now before the Massachussets State Legislature, by which every town of a certain size will be compelled to maintain, in connexion with its town school system, an evening school for education in "the industrial arts."

The late Mr. Fripp, Architect.— The newspapers mention the death, on the 15th of March, at Ottawa, Canada, after a long illness, of Mr. Sidney Bowles Fripp, architect, youngest son of the late Rev. Samuel Charles Fripp, of Bristol, in his 47th year.

TENDERS.

For Christ Church, South Hackney, N. Mr. W. Wigginton, architect :—

Hill, Keddell, & Co.	£5,538 0 0
Howard	5,488 0 0
Killby	5,431 0 0
Ennor	5,110 0 0
Dove, Brothers	4,945 0 0
Axford & Whillier	4,875 0 0

For the erection of a school church, at Rowsham, near Aylesbury, Bucks. Mr. Frederick Gotto, architect :—

Haddon	£318 0 0
Fleet & Gibbs	301 11 0
Durley & Son	295 16 3
Whiting	293 0 0
Honour	292 0 0
Newman	279 17 6
Mayne	276 0 0
Osborn	270 0 0
Cooper (accepted)	265 0 0

For eight model cottages of six rooms each, at Knutsford, Cheshire, for the Knutsford Freehold Building Committee. Mr. Sherwin, architect. Quantities supplied :—

	Cottages.	Boundary Walls, &c.
Ellis	£883 1 11	£115 16 5
Massey	850 0 0	110 0 0
Whiteman	812 9 4	109 18 6
Cardwell	784 17 8	126 18 8
Burton (accepted) *	760 0 0	112 5 0

* Being 95*l.* per cottage, including fittings, grates, &c., and outbuildings. Competition designs were advertised for; the limit of cost being 100*l.* per cottage.

For villa residence, East Sheen, Surrey. Mr. E. Ingress Bell, architect. Quantities supplied by Mr. J. Gandy :—

Sharpinton & Cole	£1,800 0 0
Adamson & Son (accepted)	1,725 0 0

For the erection of a villa residence, at Fron-olen, Barmouth, for Captain Richards. Mr. Thomas Roberts, architect :—

Davies & Son	£780 0 0
Williams & Jones	734 0 0
Williams	730 0 0
Owens (accepted)	669 0 0

For Contract No. 3, Bognor Sea Defences, Sussex. Mr. Arthur Smith, engineer. Quantities supplied by Mr. G. W. Rauwell :—

Green	£2,326 0 0
Mills	2,310 0 0
Vickers & Crane	2,263 0 0
Bushby	2,257 0 0
Goble	2,234 0 0
Hayter	2,170 0 0
Warren	2,169 0 0
Quick	2,019 0 0
Blackmore	1,934 0 0
Harries (accepted)	1,807 0 0

For addition to infirmary at the Bethnal-green Workhouse, for the Guardians of Bethnal-green. Mr. Wm. Mundy, architect. Quantities supplied :—

Cook	£2,763 0 0
Lathey, Brothers	2,370 0 0
Borton	2,360 0 0
Higgs	2,247 0 0
Nightingale	2,222 0 0
Marr	2,156 0 0
Hill, Keddell, & Waldram	2,150 0 0
Blackmore & Morley	2,130 0 0
Capps & Ritso	2,090 0 0
Garrud	2,074 0 0
King & Sons	2,029 0 0
Wicks, Bangs, & Co.	1,990 0 0
Brown & Sons	1,950 0 0

For public-house and shops, Church-street, Preston. Messrs. Myers, Veevers, & Myres, architects :—

Jackson	£689 0 0
Tomlinson	643 0 0
Walker	640 0 0
Turner	639 0 0
Brown, Brothers	630 17 0
Huntington	626 0 0
Hull	618 14 0
Baines, Brothers	616 18 0
Clayton	614 10 6
Cowell & Clayton (accepted) [Close tendering.]	604 0 0

For rebuilding Nos. 66, 67, and 68, Margaret-street, and No. 118, Great Titchfield-street. Mr. W. A. Baker, architect. Quantities estimated by Messrs. Richardson & Wagborn :—

Hyde (accepted)	£3,220 0 0

For the erection of two houses at Lower Clapton, for Messrs. Barrett & Son :—

Blackmore & Morley (accepted)	£940 0 0

For repairs, &c., Belsize House, Hampstead. Mr. H. A. Alexander, architect :—

Waterer	£910 0 0
Colls & Sons	870 0 0
Barrett	772 19 0
Mansbridge (accepted)	720 0 0

For alterations and repairs at No. 51, St. Martin's-lane-for Messrs. Hayward & Co. Mr. F. W. Potter, architect :—

		Housemaids' Closet.
Stokes	£429 0 0	—
Watson, Brothers	320 0 0	£35 0 0
Perkins	295 0 0	33 0 0
Hammer	239 10 0	—
Honor	153 0 0	10 0 0

For residence and livery stables, adjoining Railway Station at Putney, for Mr. Wm. Turner. Quantities supplied by Messrs. Williams & Taylor :—

Aviss & Co.	£3,496 0 0
Greig	3,487 7 0
Aries	3,460 0 0
Keble	3,138 0 0
Wigmore	2,999 10 0

For the erection of three houses, workshop, and gateway, for Mrs. Hoare, in West-street, Sutton, Surrey. Mr. Sparrow Harrison, architect. Quantities supplied :—

Martin	£957 0 0
Keal	897 0 0
Macers (accepted)	850 0 0

For alterations at Springfield Hall, near Chelmsford, for Mr. W. J. Beadel. Mr. F. Chancellor, architect :—

Brown	£1,700 0 0
Gardner	1,680 0 0

For new farm buildings at Little Braxted Hall, Essex, for Mr. Chas. Ducane. Mr. F. Chancellor, architect :—

Saunders	£1,800 0 0
Gardner	1,790 0 0
Brown	1,780 0 0

For new farm buildings at Parsonage Farm, Henham, Essex, for Mr. Joseph Baxendale. Mr. Fred. Chancellor, architect :—

Davies & Ratcliff	£1,399 0 0
Glasscock	1,353 0 0
Cole	1,090 0 0

For new hall and premises in Noble-street, City, for the Coachmakers' Company. Mr. Fred Chancellor, architect. Quantities supplied by Messrs. Karslake & Mortimer :—

Downs	£4,795 0 0
Hill & Sons	4,697 0 0
Turnor & Sons	4,659 0 0
Macey	4,439 0 0
Brass	4,340 0 0
Cooper & Cullum	4,328 0 0
Henshaw	4,243 0 0
Conder	4,268 0 0
Coles & Son	4,138 0 0
Brown & Robinson	3,960 0 0
Crabb & Vaughan	3,512 0 0

For new church and parsonage-house, Forth-end, Great Waltham, Essex. Mr. Fred. Chancellor, architect :—

	Church.	Parsonage.
Brown	£2,400 0 0	£1,518 0 0

For house and buildings, Ringer's Farm, Terling, Essex, for the Right Hon. Lord Rayleigh. Mr. Fred. Chancellor, architect :—

	House.	Buildings.
Gardner	—	£935 0 0
Saunders	£925 0 0	885 0 0
Brown	880 0 0	880 0 0

For new dairy, Terling, Essex, for the Right Hon. Lord Rayleigh :—

Saunders	£460 0 0
Brown	440 0 0

For new warehouse and drying-shed, Bermondsey-street, for Messrs. Todhunter & Blackmore. Mr. Elkington, architect :—

Little	£1,373 0 0
Wells	1,353 0 0
Coleman	1,329 0 0
Preston	1,327 0 0
Shepherd (accepted)	1,195 0 0

For Baptist Chapel, Peckham. Mr. Joseph Mitchell, architect. Quantities prepared by Mr. T. T. Green :—

Hart	£1,670 0 0
Croaker	1,657 0 0
Cullam	1,598 0 0
Jarrett	1,589 0 0
Tarrant	1,555 0 0
Thompson	1,540 0 0
Parker	1,490 0 0
Nutt	1,390 0 0

For the erection of the Bedford Arms Tavern, South-street, Marylebone. Mr. W. A. Baker, architect. Quantities furnished by Messrs. Richardson & Waghorn :—

Mitchell	£2,177 0 0
Manley & Rogers	1,900 0 0
Hill, Keddell, & Waldram	1,850 0 0
Phillips & Son	1,849 0 0
Brown	1,747 0 0
Brown & Robinson	1,670 0 0
Hyde	1,669 0 0

For additional training stables for Mr. H. Goater, at Littleton, Hants. Mr. A. Bedborough, architect. Quantities by Messrs. Curtis & Son :—

Grace & Hawkins	£800 0 0
Fillder	750 0 0
Stevens	683 0 0
Sanders (accepted)	676 0 0

For the erection of two houses, Queen's Walk, Nottingham, for Messrs. Carver & Davis. Mr. J. Collyer, architect. Quantities supplied :—

Attenborrow	£1,505 0 0
Marshall	1,398 0 0
Pogson	1,387 0 0
Dennett & Co.	1,348 10 0
Shepperson	1,319 0 0
Curtis	1,297 0 0
Collyer	1,289 0 0
Underwood	1,280 0 0
Wool & Slight	1,276 0 0
Bull	1,260 0 0
Messom	1,253 0 0
Vickers	1,245 0 0
Sedgwick	1,195 0 0
Andrews	1,140 0 0
Moore & Co. (accepted)	1,030 0 0

For the erection of a pair of villas, Clipstone-avenue, Peel-street, Nottingham, for Mr. William Hodgson. Mr. J. Collyer, architect. Quantities supplied :—

Ellis	£1,179 0 0
Jelly	1,170 0 0
Vickers	1,168 0 0
Bell & Son	1,126 0 0
Curtis (accepted)	1,100 0 0
Andrews	1,078 0 0

For the erection of New County Court Offices, Durham. Mr. Thos. Chas. Sorby, architect. Quantities supplied by Mr. John Scott :—

Gibson	£3,100 0 0
Taylor	3,083 0 0
Scott	3,000 0 0
Gradon	2,955 9 0
Lowrey	2,896 8 0
Robinson & Marshall	2,893 4 3
Robson & Son	2,784 0 0
Foster, jun.	2,565 0 0
Sanderson (accepted)	2,426 0 0

For building premises in High-street, Kensington, for Mr. Wickham. Mr. Josiah Houle, architect. Quantities by Mr. D. Cubitt Nichols :—

Patman & Fotheringham	£3,025 0 0
Temple & Foster	2,945 0 0
Ennor	2,920 0 0
Macey	2,892 0 0
Chamberlain, Brothers	2,863 0 0
Stimpson	2,794 0 0
Cowland	2,750 0 0
Axford & Whillier	2,698 0 0
Hockly	2,658 0 0
Langmead & Way	2,634 0 0
Scrivener & White	2,512 0 0

For building two houses and shops in High street, Kensington, for Mr. James Broadbridge. Mr. Josiah Houle, architect. Quantities by Mr. D. Cubitt Nichols :—

Ennor	£2,498 0 0
Temple & Forster	2,486 0 0
Macey	2,440 0 0
Chamberlain, Brothers	2,399 0 0
Langmead & Way	2,397 0 0
Stimpson	2,393 0 0
Cowland	2,350 0 0
Axford & Whillier	2,330 0 0
Scrivener & White	2,288 0 0

For paving and carriageway in part of St. Ervan's-road and Acklam-road, Westbourne Park Estate, for the Land and House Investment Society (limited). Mr. Josiah Houle, surveyor :—

Howlett	£1,333 0 0
George	1,260 10 0
Horsman	1,225 0 0
Nowell & Robson	1,210 0 0
Crockett	1,203 0 0
Hayden	1,200 0 0

For building the vaults in part of St. Ervan's-road and Acklam-road, Westbourne Park Estate, for the Land and House Investment Society (Limited). Mr. Josiah Houle, surveyor :—

Crockett	£640 0 0
Roberts, Brothers	646 0 0
Ireland	619 0 0
Howlett	544 0 0
Blight & Baron	463 0 0

TO CORRESPONDENTS.

J. S. Davis.—C. E.—T. T. G.—S. H.—J. C.—M. U.—H. S.—Mr. R.—A. W. P.—W. H.—W. S.—B.—J. W. K.—C. L. E.—C. G.—E. A.—A. R.—F.—S. G.—F. G.—L. S.—Architect.—W. F. L.—J. S.—E. J. B.—C. S. M.—C. S.—Mr. D.—H. A.—H. S.—H. R. W.—M. H.—Miss Z.—A. J.—B. & M.—A. W.—Mr. C.—T. C. S.—J. B. (photographs received, but no *particulars*).—G. & Son (amount of premium depends materially on the position of the parties, the advantages to be expected, &c. and cannot be settled by an outsider).—Z. (the number in advertisement should have been 18, not "88").—Mr. Remington's letter on Channel Railway shall have consideration next week).—M. C. (look to Cresy's "Encyclopædia of Engineering").—Carver (the process in question has been applied at the Houses of Parliament, but not to any great extent. We decline to recommend any of the processes.—New York (in type).

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

TO SUBSCRIBERS.

GOOD FRIDAY.

NOTICE.—"THE BUILDER," for the week ending APRIL 16th, will be published at ONE p.m. on THURSDAY, 14th inst. Advertisements for insertion in that Number must therefore reach the Office **before THREE** p.m., *on WEDNESDAY, 13th.*

TOWNS DRAINAGE and SEWAGE UTILIZATION COMPANY.

CHAIRMAN—Sir William Wiseman, Bart. K.C.B.
ACTING ENGINEER—Mr. Bailey Denton, Whitehall-place.

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